City of Nashua
Central Purchasing
229 Main Street
Nashua NH 03060

November 24, 2014

INVITATION TO BID

Southwest Trail
IFB0592-010615

The City of Nashua invites bids from qualified contractors to construct a trail in the Southwest corner of the City. This trail system shall connect Gilson Rd to Buckmeadow Rd. through conservation land and will be approximately 4 miles in length. The proposed trail will be 3" thick and 8' wide, constructed from a combination of different materials such as natural and asphalt trail. Contractors are to submit pricing for the base bid items.

INSTRUCTIONS TO BIDDERS

Bids must be submitted on the Bid Form (attached) in its entirety with **(1) original and two (2) copies,** in a sealed envelope plainly marked **"Southwest Trail"** and must be received at Central Purchasing Office, 229 Main Street, Lower Level, Nashua, NH 03060 prior to **3:00 PM on Tuesday, January 6th, 2015**.

Further details are available on the City's web site, www.nashuanh.gov, under Citizens Favorites, Current Bid Opportunities; document **IFB0592-010615.** Bids will be opened in public on the due date and time. Results of the bid opening will be posted on the City's web site, under Bid Results, within twenty-four (24) hours of the opening.

A **mandatory site visit** has been scheduled for **Thursday, December 4th at 10:00AM.** Participants are to meet at the Gilson Rd. parking lot (intersection of Gilson Road and Countryside Drive---also known as the Rail Trail Parking lot). You or your representatives are required to attend if you intend to submit a bid. The meeting is an opportunity for the City to provide an overview of the project and its objectives, and for participants to request additional information directly from City staff managing or participating in the project. Full scale drawings will be provided at that time.

To be eligible for an award, a bidder must be deemed "responsible". A responsible bidder 1) has the ability, capacity and skill to provide the goods or services required; 2) can provide the goods or services within the time frame specified; 3) has a satisfactory record of integrity, reputation, judgment and experience; 4) has sufficient financial resources to provide the goods or services; 5) has an ability to provide future maintenance and support as required; and 6) has developed a positive track record with the City of Nashua to the extent the bidder has previously provided goods or services.

Delivery of the bids shall be at the vendor's expense. The time of receipt shall be considered when a bid has been officially documented by the department, in accordance with its established policies, as having been received at the location designated above. The City of Nashua accepts no responsibility for mislabeled mail. Any and all damage that may occur due to shipping shall be the vendor's responsibility.

Postmarks or other timestamps will **not** be accepted in lieu of actual delivery. The firm can use whatever delivery mechanism it chooses as long as it remains clear that the firm is responsible for submissions prior to the date and time.

The City of Nashua assumes no liability for the payment of costs and expenses incurred by any bidder in responding to this request for bids. All bids become the sole property of the City of Nashua. This request for bids is not a contract and alone shall not be interpreted as such but rather serves as an instrument through which bids are solicited.

The project timeline is as follows:

	Date	Time/Place
Mandatory Site Visit	Thursday, December 4th, 2014	Gilson Road parking lot (intersection of Gilson Road and Countryside Drive, also known as the Rail Trail Parking Lot) at 10:00AM
Deadline for Questions to be submitted in writing	Wednesday, December 10th, 2014	12:00 NOON
Answers/clarifications posted	Monday, December 15th, 2014	4:00 PM
Bids Due	Tuesday, January 6th, 2015	3:00 PM
Bid Award	TBA	
Project Completion Deadline	July 31, 2015	

All inquiries concerning this IFB including, but not limited to, requests for clarifications, questions, and any changes to the IFB, shall be submitted **in writing**, citing the IFB title, IFB number, Page, Section, and Paragraph, and submitted to the City's project manager:

Mr. Chris Sullivan
City of Nashua, Planning Department
229 Main St
Nashua NH 03060
Email at sullivanc@nashuanh.gov

Vendors are encouraged to submit questions via email; however, the City assumes no liability for assuring accurate/complete email transmission/receipt and is not responsible to acknowledge receipt. **Inquiries** must be received by the City's Project Manager (see above) **no later than Wednesday, December 10th, 2014 at 12:00 NOON.** Inquiries received later than this date shall not be considered properly submitted. The City will consider all timely-received questions and requests for change and, if reasonable and appropriate, will issue an addendum to clarify or modify this IFB. Answers to vendor submitted questions and other addenda will be posted under document **IFB0592-010615** on the City of Nashua website; www.nashuanh.gov under Citizen Favorites, Current Bid Opportunities no later than **Monday, December 15th, 2014, at 4:00 PM.**

The City of Nashua may reject any or all of the bids on any basis and without disclosure of a reason. The failure to make such a disclosure shall not result in accrual of any right, claim or cause of action by any unsuccessful bidder against the City of Nashua. The City reserves the right to waive any irregularities when the public interest will be served thereby. The City also reserves the right to negotiate any change or amendment in any bid without soliciting further bids if the action is necessary for the best interest of the City.

All bids are binding for sixty (60) days following the deadline for bids, or until the effective date of any resulting contract, whichever is later.

The successful bidder must maintain the following lines of coverage and policy limits for the duration of the contract. Any subcontractors used by the contractor are subject to the same coverage and limits and is a subcontractor to the CONTRACTOR and not the OWNER. It is the responsibility of the CONTRACTOR to update Certificates of Insurance during the term of the contract.

The City of Nashua must be named as Additional Insured.

Provide coverage for not less than the following amounts or greater:

- General Liability: $1,000,000 per Occurrence
  $2,000,000 Aggregate
- Motor Vehicle Liability: $1,000,000 Combined Single Limit
  Coverage must include all owned, non-owned and hired vehicles.
- Workers' Compensation Coverage according to Statute of the State of New Hampshire:
  $100,000/$500,000/$100,000

All bidders and subcontractors at every tier under the bidder will fully comply with NH RSA 281-A, "Workers' Compensation". It is the responsibility of the CONTRACTOR to submit to the OWNER certificates of insurance for all other subcontractors prior to the start of the project. It is the responsibility of the CONTRACTOR to provide the OWNER with updated certificates of insurance for the CONTRACTOR and all subcontractors 10 days prior to the expiration of coverage. The OWNER may, at any time, order the CONTRACTOR to stop work, suspend the contract or terminate the contract for non-compliance. All subcontractors are subject to the same insurance requirements as the CONTRACTOR.

No bid will be considered unless accompanied by a bid security in the form of a Certified or Cashier's Check, or Bid Bond, in an amount not less than five percent (5%) of the bid.

The successful contractor will be required to post a 100% Performance Bond and a 100% Payment Bond within ten (10) days of Notice to Proceed.

This Invitation for Bid also includes the following documents:

IFB0592-010615 SAMPLE CONTRACT
IFB0592-010615 DRAWINGS SIGNAGE AND PLANTINGS

The City is exempt of all taxes. All bids must be FOB Nashua, NH. All bidders must comply with all applicable Equal Employment Opportunity laws and regulations. Please note that Davis Bacon Wage rates do not apply to this project.

NRO 5-71 (A), the City of Nashua supports the concept of purchasing products which are biodegradable, can be or have been recycled, or are environmentally sound. Due consideration will be given to the purchase of such products. If you are bidding on any such products which qualify, please so indicate in a cover sheet by item number and description.

Pursuant to NRO 5-78 (F), the purchasing manager shall not solicit a bid from a contractor who is in default on the payment of taxes, licenses or other monies due the city. Therefore, this bid request is void as to anyone who is in default on said payments.

As noted above, any questions relating to this project should be directed to Mr. Chris Sullivan, via email at sullivanc@nashuanh.gov.

Respectfully,

Mary Sanchez, CPPB

Mary Sanchez, CPPB
Purchasing Agent II
City of Nashua
sanchezm@nashuanh.gov

IFB0592-010615
SOUTHWEST TRAIL
SECTION: CONSTRUCTION

INSTRUCTIONS TO BIDDERS

SUMMARY

1.1 Bidders Representations
1.2 Clarification and Amendments of Bid Documents
1.3 Substitutions
1.4 Addenda
1.5 Withdrawal/Modification of Bid
1.6 Bidding Procedure
1.7 Consideration of Bids
1.8 Submittals

BIDDERS REPRESENTATIONS

1. The bidder depicts that they have read and reasonably understood the Bid Documents and the submitted bid represents such.

2. The bidder has attended the **mandatory site visit** scheduled for **Thursday, December 4th, at 10:00AM** and is familiar with conditions of the site.

3. The bid is based on the materials, equipment and systems as required by the Bid Documents.

4. Bidder has contractor qualifications on file at the City of Nashua Planning Department and has provided the updated Bidder Qualifications statement (pages 60-61 of this document) with the bid submittal. Note that Bidder Qualifications statement and updates are non-public information.

CLARIFICATION AND AMENDMENTS OF BID DOCUMENTS

1. All inquiries concerning this Invitation for Bid (IFB), including, but not limited to, requests for clarifications, questions, and any changes to the IFB, shall be **submitted in writing**, citing the IFB title, IFB number, Page, Section, and received **no later than Wednesday, December 10th, 2014 at 12:00 NOON to**:

   Mr. Chris Sullivan, via email at sullivanc@nashuanh.gov
   City of Nashua, Planning Department
   229 Main St
   Nashua NH 03060

2. The City will consider all timely-received questions and requests for change and, if reasonable and appropriate, will issue an addendum to clarify or modify this IFB. Answers to vendor submitted questions and other addenda will be posted under document **IFB0592-010615** on the City of Nashua website; www.nashuanh.gov under Citizen Favorites, Current Bid Opportunities no later than **Monday, December 15th, 2014, at 4:00PM.**

3. Bidders shall report all inconsistencies and ambiguities to the City of Nashua Planning Department.

4. Bids must include **all** items listed on the Bid Form. If included, additional items proposed by the contractor must be itemized on a separate option line.

SUBSTITUTIONS

1. Materials, products and equipment described in the bid documents establish a standard of required function, dimension, appearance and quality to be met.

2. All substitutions shall be submitted for approval to the City of Nashua Planning Department.

ADDENDA

1. Any addendums will be emailed to all mandatory pre-bid attendees and will be posted on the City of Nashua web site.

2. Bidders shall acknowledge receipt of all addenda received with their bid submittal.

WITHDRAWAL/MODIFICATION OF BID

1. A Bid may be withdrawn or modified at any time prior to the stipulated bid opening.

2. Bidders withdrawing bids should do so in writing, addressed to the City of Nashua and copied to the Planning Department Staff.

3. Withdrawn bids may be resubmitted before the stipulated bid opening time.

BIDDING PROCEDURE

1. All bids shall be submitted (one original and two copies of same) on original bid forms or copies thereof. Bids shall reflect the most recent version of the specifications, drawing and addenda.

2. All items on the Bid Form shall be filled out in ink; items with no charge shall be marked "n/c".

3. Bids where the total does not equal the sum of the items, the lessor of the sum of the items or the total will be used as the bid amount.

4. Bids must be submitted on the Bid Form (Pages 62-66) in its entirety with **(1) original and two (2) copies,** in a sealed envelope plainly marked **"Southwest Trail"** and must be received at the Central Purchasing Office, 229 Main Street, Lower Level, Nashua, NH 03060 prior to **3:00 PM** on **Tuesday, January 6, 2015.** Bidders are responsible for timely delivery of bids.

5. If a bid is late, incomplete, and not on proper forms, the bid will not be considered

CONSIDERATION OF BIDS

1. All sealed bids will be opened and publicly read aloud at the designated time and place as outlined in the Invitation to Bid.

2. The City of Nashua shall have the right to reject any and all bids, reject a bid not accompanied by a bid security, or by other data required by the bid documents, or reject a bid which is in any way incomplete or irregular.

3. It is the intent of the City of Nashua to award a contract to the lowest responsible bidder provided the bid has been submitted in accordance with the requirements of the bid documents and does not exceed the funds available. The City of Nashua shall have the right to waive informalities in a bid received and to accept the bid which, in the City of Nashua's judgment, is in the City of Nashua's best interests

END OF SECTION

WEEKLY PROGRESS MEETING

CONTRACTOR CONSTRUCTION PROGRESS SCHEDULE

PURPOSE

This section is to provide the details of each phase of the project so that the project shall be completed in a timely fashion and the City will have an up to date schedule for this project.

The contractor shall be responsible for preparing a coordinated combined progress schedule with the sub-contractors after the award of the contract. This schedule shall meet all of the requirements identified in the City of Nashua.

The City of Nashua must review and analyze this progress schedule and recommend approval/disapproval to the City until a satisfactory version is approved. The City must approve the baseline schedule prior to the start of construction and prior to the contractor submitting invoices for payment.

The City will not accept the progress schedule until it meets the project contract requirements and any delays to the start of the construction work will be against the contractor until the date of acceptance by the City. The construction progress schedule shall be reviewed, approved, and updated by the contractor at each regularly scheduled construction job meeting.

The Planning Department point of contact and City project manager is:

Mr. Chris Sullivan
City of Nashua, Planning Department
229 Main St
Nashua NH 03060
Email: sullivanc@nashuanh.gov

PURPOSE

This section is to provide the details of the Construction Progress Meeting.

GENERAL

The purpose of the Construction Progress Meeting is to discuss/review all pertinent project information with the team members from the general contractor, and the City of Nashua.

PROCEDURE

The information below contains the details associated with the Construction Progress Meeting.

The Construction Progress Meeting shall be conducted on a weekly basis, but may be of greater or lesser frequency as the project requirements change.

The responsibilities for the individuals attending the meeting shall include familiarization with the project and authorized to conclude matters relating to their scope of work.

SITE CLEARING

GENERAL

WORK INCLUDED

A. This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to clear the work area of unwanted shrub and, unwanted soil and plant material, and prepare the work area for the installation of a trail.

SUBMITTALS

1. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing activities.

PRODUCTS

SOIL MATERIALS

1. Obtain prior approval of imported borrow soil materials off-site when satisfactory soil materials are not available on-site within the trail area.

EXECUTION

INSTALLATION

A. Install erosion-control measures prior to any site clearing activities to minimize soil erosion and discharge of soil-bearing water runoff or airborne dust to existing drainage system, adjacent properties and waterways.

B. Notify Dig-Safe before site clearing.

C. Locate and clearly flag trees and vegetation to remain. (Approved by the Planning Department)

D. Protect existing trees and vegetation to remain from damage during construction.

1. Confirm areas of clearing with City of Nashua at start of construction.
2. Restore damaged areas to their original condition, as acceptable to City of Nashua.

E. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from City of Nashua and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

F. Remove invasive plants by hand methods, clear and grub site to remove unwanted materials. The contractor is responsible for removal and proper disposal of unwanted materials form the site.

TREE PROTECTION

A. Erect and maintain a temporary fence around drip line of individual trees to remain. Remove fence when construction is complete.

B. Do not store construction materials, debris, or excavated material within drip line of remaining trees.

C. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

D. Do not excavate within drip line of trees, unless otherwise indicated.

E. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible:

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches in diameter with emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Cover exposed roots with wet burlap to prevent roots from drying out. The contractors will backfill with soil as soon as possible.

5. Follow more stringent specifications if specified on Landscape Plans.

F. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by City of Nashua
   1. Employ a qualified arborist, licensed in jurisdiction where project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
   2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified arborist.

END OF SECTION

EARTHWORK

GENERAL

SCOPE OF WORK

A. The work to be done under this section shall require the contractor to provide all labor, material, equipment and transportation necessary for the contractor to excavate and provide the material required to construct a trail.

FINISHED GRADES

A. The words "finished grades" as used herein mean the required final grade elevations indicated on the drawings or as directed by the City of Nashua. Where not otherwise directed, the work area will be given uniform slopes and smooth transitions to existing grades at the limits of work.

PUBLIC UTILITIES

A. Conform to the requirements of the respective authorities having jurisdiction over the existing utilities and notify the appropriate officials of such authorities in advance of performing any work in the vicinity of active utilities. Obtain written permission to perform the work prior to commencing same. If, in the progress of excavation, any utility should become damaged and result in any damage to public or private property, restore to the original condition, at no additional cost to the City of Nashua, anything which has been damaged or disturbed.

B. Should any utility be encountered in the excavation work which is not indicated on the drawings, notify the City of Nashua in writing and request disposition for same, before proceeding to perform any work on same.

WORK IN THE PUBLIC WAYS

A. Notify the appropriate municipal officials at least seven calendar days in advance of commencing any work in the public ways and obtain all required permission to perform this work. Perform all work in the public ways in a manner required by the City of Nashua Public Works Department.

B. Should there be any conflict between requirements specified in the contract documents and those of the municipal authorities, the City of Nashua requirements shall govern.

C. Do not close or obstruct any streets or sidewalks unless and until they have been discontinued by the appropriate municipal authority or unless and until he shall have first secured all necessary or other permits therefore. No materials whatsoever shall be placed or stored in the streets. Conduct all operations to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks, or other facilities near enough to the work to be affected thereby.

PERMITS AND CODES

A. The contractor is responsible for securing all permits and licenses required for the work of this section prior to commencing the work.

B. Comply with all applicable codes, ordinances, rules, regulations and laws of all local, municipal, and state authorities having jurisdiction over the work, without additional cost to the City of Nashua.

PRODUCTS

SOILS AND BORROW MATERIALS

GENERAL

1. All soils and borrow materials shall conform to the latest New Hampshire department of Transportation (NHDOT) standards.

ORDINARY BORROW:

1. Ordinary borrow shall consist of a material satisfactory to the City of Nashua and not specified as another particular type of soil borrow. This material shall have the physical characteristics of soils designed as group A-1, A-2-4 or A-3 under AASHTO-M145. It shall have properties such that it may be readily spread and compacted or the formation of embankments.

LOAM BORROW:

1. Loam borrow shall meet the requirements as specified in this section. Loam shall be of a uniform composition throughout without admixture of subsoil, and shall be clean and reasonably free from clay, lumps, stones, roots two (2) inches or more in diameter, or other similar substances. Loam shall not contain toxic substances harmful to plant growth. It shall be free of weeds, weed seeds and debris, or other objects that might hinder planting operations.

   a. Loam shall not contain less than four percent (4%) nor more than twenty percent (20%) organic matter, as determined by the loss ignition of samples oven-dried at a constant weight at a temperature of 230°F, ± 9°F.

   b. Loam shall not be worked, excavated or delivered while in a frozen or muddy state.

   c. Excavated materials: Materials from on-site excavation work may be used only if such materials meet the requirements specified herein and only after approval of the City of Nashua has been received for proposed usage. If sufficient suitable fill material is not available from excavations under the contract, the contractor shall supply additional fill, suitable for use, from other sources at no additional cost to the City of Nashua. Excavated materials that contain invasive plant material **are prohibited.**

EXECUTION

COORDINATION

A. Coordinate the work of this section with the respective trades responsible for installing interfacing work, to assure that the excavation, backfilling, and filling work performed hereunder is acceptable to such trades for the installation of their work.

DUST CONTROL

A. Employ all methods required to effectively control dust created by the work of this type.

DRAINAGE

A. Upon entering the premises, the contractor assumes all responsibility for the site and subsurface drainage within the work area and maintain such drainage during the life of this contract in a manner acceptable to the City of Nashua, at all times protecting and maintaining the existing conditions in adjacent areas.

B. Legally remove by pumping, draining or bailing all water which may accumulate or be found on the site within the contract limits, where excavation and grading are to be done. Excavate and form all pump wells, sumps, dams, flumes or other necessary works to keep excavations clear of water. Maintain at all times, sufficient and satisfactory pumping machinery, including standby equipment. Maintain excavations free from water until all backfilling operations have been completed. Presence of ground water in the soil shall not constitute a condition for which any increase may be made in the contract price.

C. Water from excavations shall be disposed of in such a manner as will not cause injury to public health nor to public or private property, nor to existing work, nor to the work completed or in progress, nor to the surface of roads, walks, and streets, nor cause any interference with the use of the came by the public. Under no circumstances shall plantings be installed in excavations containing standing water.

C. Maintain all areas, mulched under the work of this section, until the vegetation has been established.

COLD PROTECTION:

A. Keep the operations under this contract clear and free of accumulations of snow as required to carry out the work.

PREPARATORY WORK:

A. Carefully remove debris in all areas where excavation or regrading work is to be performed hereunder, and in other locations indicated on the drawings. Legally dispose of all removed materials off -site.

EXCAVATION:

A. Include the excavation of earth and all other material to the depths, form and sizes as shown on drawings, and as specified hereunder for planting and loam areas necessary to the completion of the project.

B. Remove all unsuitable material encountered within the work area. Should the City of Nashua direct that unsuitable material be removed from beyond the limits of the work area defined in the contract documents, the contractor shall submit a change order to the City of Nashua. The following constitute unsuitable materials:
   1. All peat or soil containing or any other material subject to decomposition or decay.
   2. All fills, buried building material, and other soil materials which do not meet suitable criteria and the requirements specified herein.
   3. Cinders.

C. In general, machine excavation will be permitted down to final grade. It is the contractor's responsibility to operate his/her machinery in a manner within applicable safety guidelines at all times.

BURIED ASBESTOS WASTE:

When construction operations encounter and require the disturbance of buried asbestos waste, the removal, transportation, and disposal thereof shall be in accordance with applicable federal, state and local rules, regulations and guidelines. The contractor and workers shall be licensed per Env-A1800 for working at asbestos waste disposal sites and on Burred ACM waste and shall follow all procedures that are necessary to officially close an asbestos waste disposal site. Submit an Asbestos Disposal Site Work Plan (ADSP) and any other documentation required and any changes in accordance with NHDES regulations Env-Sw 2100, Env-Sw 900 and Env-An 1800 for documentation to the Engineer. Rule interpretation by the Department of Environmental Services releases the Contractor from the requirements of Env-A1800 or Env-Sw2100. Any asbestos found shall be reported the City of Nashua's Planning Department.

The contractor will provide a qualified technician at the job site to conduct work inspections for asbestos hazards and perform air monitoring in accordance with the final site asbestos contingency plan. The EH & S technician will be supervised by the Contractor's project manager and certified industrial hygienist. Services will not include OSHA hazard unless otherwise agreed to. The asbestos waste shall be deposed of at the City of Nashua's Landfill.

END OF SECTION

EROSION CONSTROL

GENERAL

SCOPE WORK

A. This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to install and maintain the soil erosion measures specified in the contract documents, and to maintain a work area in accordance with New Hampshire Department of Environmental Services.

SUBMITTALS

A. Samples and manufacturer's product data, as applicable shall be submitted to the City of Nashua for approval all materials proposed to be installed by the contractor to mitigate soil erosion from the work area.
B. Narrative of the sequence of work, showing measures taken by the contractor to mitigate soil erosion from the work area.
C.

PRODUCTS

A. The preferred method of erosion control would be a 18" silt sack, Meadowbrook Garden Center-750 Franklin Street - Hanson, MA 02341 -PH 781-447-9221 FX 781-447-6051 (or approved Equal)

EXECUTION

INSTALLATION:

A. Install erosion-control measures prior to any site clearing activities to minimize soil erosion and discharge of soil-bearing water runoff or airborne dust to existing drainage system, adjacent properties and waterways.

B. Notify Dig-Safe before installing soil erosion measures.

C. The contractor is responsible to maintain the work area in accordance with New Hampshire Department of Environmental Services.

D. The contractor is responsible to repair damage to installed soil erosion measures in accordance with New Hampshire Department of Environmental Services erosion policies.

E. Soil erosion measures shall remain in place until work area is stabilized.

F. Routine inspections are an integral part of regularly performed maintenance activities--cleaning, repair, and replacement--necessary to ensure the integrity and effectiveness of BMPs. Construction site activities can damage BMPs. Earthmoving equipment, for example, can easily dislodge an entrenched silt fence. Routine inspection and maintenance minimizes the work required to prepare a site before a rain event, and it helps protect a site from unforeseen rains.

END OF SECTION

SEEDING

SCOPE OF WORK

A. This section includes furnishing all labor, materials, and equipment, sediment control and seed and incidental materials necessary to accomplish all seeding of New England Conservation/Wildlife Mix (Wildlife Mix) for the Southwest Trail, to complete in place, maintained, and accepted, in accordance with the contact documents. Seeding shall be installed at all disturb areas along the entire trail where applicable.

B. The contractor shall bear the responsibility and cost of furnishing and applying water or any other substances, as necessary to ensure the sustainability of New England Conservation/Wildlife seeded areas, as part of the work of this contract.

SUBMITTALS

In accordance with requirements of general specifications, the contractor shall submit the following to the City of Nashua Planning Department for review and approval:

A. Two copies of information for seed mixes including the following:
   1. Name and address of the seed supplier.
   2. Point of genetic origin, source of seed lot, seed lot number, and dates of harvest for each of the various types of seed.
   3. Certification of seed mix composition and proportion, indicating named varieties by percent, percent germination, purity, percent crop seed, percent inert matter, and percent weed seed content. Accuracy shall be to .01 percent.
   4. Estimated number of seeds per pound of each type of seed in the mix.

B. Two copies of information detailing proposed fertilizers, mulch materials, and slope protection material (if required) to be applied to seeded areas.

C. Two copies of watering, fertilizing, and maintenance schedule.

D. Two copies of marked up prints indicating the square footage of all proposed seeded areas with quantities of various soil additives and amendments, and quantities of seed for each area prior to beginning work.

PRODUCTS

MATERIALS:

A. FERTILIZER

1. Use of a slow release fertilizer is required. The use of LESCO 50 lb. PPSCU Starter Fertilizer is preferred, or approved equal.

B. SEED

1. Seed shall be of an approved perennial variety mixture, the previous year's crop, clean, and high in germinating value. Point of genetic origin shall not be greater than 300 miles north or 200 miles south of the site where seed is proposed to be sown. Parameters for acceptance shall account for the elevation of the point of seed origin such that every difference in elevation of 1000 feet shall be considered equivalent to 175 miles north.

2. Weed seed content shall be less than 0.5 percent by weight and include no noxious weeds. Seed shall be obtained from a reliable seed company and shall be accompanied by seed analysis reports certifying compliance relative to mixture purity and germinating value. Seed shall be furnished and delivered in new, clean, sealed and properly labeled containers. All seed shall comply with applicable state and federal laws. Seed that has become wet, moldy or otherwise damaged shall not be accepted.

3. New England Conservation/Wildlife Mix shall contain the following seed species: Virginia Wild Rye, (Elymus virginicus), Little Bluestem, (Schizachyrium scoparium), Big Bluestem, (Andropogon gerardii), Creeping Red Fescue, (Festuca rubra), Switch Grass, (Panicum virgatum), Partridge Pea, (Chamaecrista fasciculata), Deer Tongue, (Panicum clandestinum), Indian Grass, (Sorghastrum nutans), Ox Eye Sunflower, (Heliopsis helianthoides), Common Milkweed, (Asclepias syriaca), Spotted Joe Pye Weed, (Eupatorium maculatum), Grass Leaved Goldenrod, (Euthamia graminifolia), Blue Vervain, (Verbena hastata), New England Aster, (Aster novae-angliae), Early Goldenrod, (Solidago juncea). New England Conservation/Wildlife Mix shall be sown at the rate of 3-4 pounds per acre.
4. Materials to be used in mulching seeded areas shall be free of weed seed and shall conform to the following requirements:
   a. Straw Mulch shall consist of mowed and properly cured grass, clover or other acceptable plants. No hay shall be used.
   b. Straw Mulch shall consist of stalks or stems of grain after threshing.

C. HYDROSEED MULCH, TACKIFIERS AND WATER RETENTION AGENTS

1. Wood fiber mulch for Hydroseed application shall be a manufactured product of natural wood cellulose fibers with a non-toxic green marking dye incorporated to ensure uniform distribution. Mulch shall be packed in sealed original containers, clearly labeled with brand name and manufacturer. It shall have delivered moisture content less than 12 percent.

2. Hydroseed tackifier shall be a powdered starch-based product approved by City of Nashua's Planning Department. Hydroseed tackifier shall be applied in conjunction with the hydroseed slurry in accordance with the manufacturer's recommendations.

3. Moisture retention agent shall be a powdered starch-based product, approved by the City of Nashua's representative, and shall be capable of retaining up to 400 times their weight in water. Moisture retaining agents shall be added to the hydroseed slurry in accordance with the manufacturer's recommendations. Moisture retention agent shall be 'Hydro-Gel' as manufactured by Finn Corporation, Fairfield, OH, or approved equal.

D. SLOPE EROSION PROTECTION

1. Erosion control blanket shall be 100 percent biodegradable mesh with 100 percent biodegradable straw or straw/coconut fill. Fill shall be held together by biodegradable fastening. Weight shall be 0.50 pounds per square yard. Erosion control blankets shall be applied parallel to direction of water flow. The erosion control blankets shall be by North American Green, Evansville, IN, or approved equal. For slopes 2:1 or greater, erosion control blanket shall be composed of 70 percent straw 30 percent coconut fiber, Model SC150. For slopes less than 2:1, erosion control blanket shall be high velocity straw matting, Model S150.

2. Six-inch wire staples shall be placed in accordance with the manufacturer's recommendations to anchor the mesh material. Staples shall be biodegradable.

E. **WATER**

1. Water shall be furnished by the contractor, unless otherwise specified, and shall be suitable for irrigation and free from ingredients harmful to plant growth and viability. The delivery and distribution equipment required for the application of water shall be the furnished by the contractor, at no additional cost to the City of Nashua.

F. **INSECTICIDES**

1. Use of insecticides is prohibited in this Contract.

G. **HERBICIDES**

1. Use of herbicides is prohibited in this Contract.

H. **FUNGICIDES**

1. Use of fungicides is prohibited in this Contract

EXECUTION

GENERAL

A. All work shall be performed by skilled supervisor with a minimum of 2 years of New England Conservation/Wildlife Mix seed establishment experience. The laborers shall be under the full-time supervision of a qualified foreman.
B. Seeding operations shall not begin until at least 4 days have elapsed after the application of lime and fertilizer and seedbed areas are reviewed and approved by the City of Nashua.
C. Seeding shall be done when soil and weather conditions permit. Soil temperature shall be at least 50 degrees F. If it becomes necessary for seed to be sown after June 15, provisions shall be made for applying supplementary water and using a mulch cover over seeded areas at no additional cost to the owner.
D. If there is a delay in seeding, during which weeds grow, or soil from newly loamed areas is washed out, the contractor shall eliminate the weeds or replace the soil before sowing the seed, without additional compensation.
E. Seed shall be sown at the approved rate, on a non-windy day by hand.
   1. All newly loamed areas shall be shall be lightly raked and hydroseeded in accordance with these specifications and as approved by the City of Nashua.
F. The surface shall be kept moist by a fine spray until the seed shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than 3 square feet, the contractor shall reseed, roll, and water as necessary to obtain proper germination.

G. If there is insufficient time in the planting season to complete soil preparations, fertilizing, and seeding, permanent seeding may be left until the following planting season, at the option of the City of Nashua. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized, and the permanent seed crop shall be sown as specified.

H. Protection of newly loamed and graded areas is required and shall be accomplished by whatever means necessary, such as straw applied with a tackifier, or by other means approved by the City of Nashua. The contractor shall be responsible for the prevention of siltation in areas beyond the limit of work and for all means of protection during the maintenance period at no additional cost to the City of Nashua.

BROADCAST SEEDING

A. Mechanical broadcast machinery shall be equipped with special seed boxes to accommodate the irregularly shaped and sized New England Conservation/Wildlife Mix. Seed boxes shall include auger-agitators, or the seed mix shall include a carrier, to ensure uniform flow and distribution of seed.

B. The seed mix to be broadcast shall be sown at the rate recommended by the seed supplier, or as directed by the City of Nashua's Planning Department. Seed shall be divided into 2 equal amounts and uniformly distributed in 2 applications at right angles to each other. Seed shall then be raked lightly into the soil to a depth of l/4 inch.

C. If mulch is not necessary the seed shall be directly firmed into the soil with a roller that will apply pressure between 75 and 100 pounds per linear foot of width.

HYDROSEEDING

A. The application of slow release fertilizer, seed and mulch may be accomplished in a single operation by the use of an approved hydroseeding machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The slurry shall be of such consistency that it can be sprayed from a hydroseed gun or through at least 200 feet of 1 ½ inch diameter hose. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of, seed and mulch shall be equal to the specified quantities.

B. Prior to the start of hydroseeding, the contractor shall furnish to the City of Nashua's representative, in writing, the weights, New England Conservation/Wildlife Mix seed, tackifier (as required), moisture retention agent (as required), and mulch per 100 gallons of water to be used. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the hydroseeding operation are unsatisfactory, the contractor will be required to abandon this method, fertilizer, seed, and mulch by other means.

C. Seed shall be incorporated into the mulching material to obtain a minimum sown coverage of 200 pounds of the specified seed per acre. Seed substitutions may require rate adjustments as recommended by the seed suppliers, if approved by the City of Nashua's representative.

D. Wood fiber mulch shall be uniformly spread over certain selected seeded areas at the minimum rate of 1,400 pounds per acre unless otherwise directed. Mulch shall be placed by spraying from an approved machine with pressure sufficient to cover the entire area in a single operation.
E. The contractor shall immediately cleanup hydromulch over sprays from plant materials, pavements, furnishings, etc., to the satisfaction of the City of Nashua's representative.

PLACING MULCH AND SLOPE EROSION PROTECTION

A. Straw mulch shall be loosely spread to a uniform depth over all areas designated on the plans, at the rate of 4-1/2 tons per acre, if needed. Mulch shall be firmed into the soil with a roller weighing between 75 and l00 pounds per linear foot of tread.
B. Straw mulch may be applied by hand if required, if in the judgment of the City of Nashua's representative, the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. The apparatus shall be capable of spreading at least 80 percent of the hay or straw in lengths of 6-inches or more, otherwise it shall be spread by hand without additional compensation.
C. Slope erosion control blankets shall be placed as indicated on the plans or as directed by the City of Nashua.

FIRST YEAR MAINTENANCE

A. The contractor shall maintain and protect the entire seeded area until final acceptance at the completion of the contract or for 60 days, whichever is longer. Maintenance shall include watering as specified, fertilizing, and control of weeds. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit.
B. The contractor shall be responsible to regularly seed areas with the equivalent of 1-inch minimum of rainfall per week, or as necessary to develop and sustain dense, green growth.
C. New England Conservation/Wildlife Mix areas shall be periodically inspected, beginning 4 – 6 weeks after planting. Inspections shall include monitoring for seedling vitality, insect pest populations, opportunistic weed growth, and disease.
D. The Contractor shall be responsible for securing all New England Conservation/Wildlife seeded areas from physical damage as necessary, including warning signs, barriers, temporary fencing, or other means of protection, through the guarantee period until final acceptance. All damaged areas shall be repaired to reestablish healthy vigorous growth of turf at no additional cost to the City of Nashua. All temporary barriers shall remain the property of the contractor and shall be removed by the contractor upon final acceptance by the City of Nashua's Planning Department.

GUARANTEE

A. Seeded areas shall be guaranteed until final acceptance of the project, or, in the case of late summer or fall planting, the guarantee period shall extend through the following spring.

FINAL INSPECTION AND FINAL ACCEPTANCE

A. At the end of the guarantee period, the contractor shall provide written notice to the City of Nashua not less than 10 days before the anticipated date of final inspection for final acceptance.
B. The City of Nashua shall recommend final acceptance of the work of this section only after completion and City of Nashua's Planning Department has re-inspected all necessary repairs, renewals or replacements.

END OF SECTION

PRUNING AND REMOVAL OF EXSITING TREES

This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to clear the trail area of unwanted shrub and, unwanted branches and plant material, and prepare the work area for the installation of a natural trail.

a. Trees shall be pruned in accordance with American Association of Nurserymen Standards to preserve the natural character of the plant.

b. Trees shall be pruned only after the plant has been completely planted. All large pruning cuts, one-half (½) inch diameter and larger, shall be made along the bark branch ridge. Pruning cuts shall not be made to breach or otherwise interfere with the branch collar. All pruning cuts less than one-quarter (¼) inch diameter shall be made with a sharp pair of hand pruners as close to the main stem as possible without damaging the cambium or bud.

c. All dead or dying limbs and tips, sucker growth, water sprouts, crossing or rubbing branches, broken or damaged branches, and/or diseased or insect infested limbs shall be removed. Questionable weak limb and branch removal that may disfigure the tree should be left for final approval by the City of Nashua.

d. Never cut the tree leader.

a. Any and all pruning shall be done with clean, sharp tools.

f. Tree paint shall not be used to cover pruning cuts.

CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new plantings. Removal includes digging out stumps and obstructions and grubbing roots.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed sub grade.
4. Use only hand methods for grubbing within drip line of remaining trees.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

C. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

C. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, invasive plant material and other waste materials.

D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. The contractor shall grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 120 inches.
2. Do not stockpile topsoil within drip line of remaining trees.
3. Dispose of excess topsoil in locations designated by the City of Nashua within the site.
4. Stockpiles to be stabilized by contractor.
5. Stockpiles to have erosion control installed around them.

INVASIVE PLANT REMOVAL

This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to clear the work area of unwanted shrub, unwanted soil and plant material, and prepare the work area for the installation of a trail

1. Excavation

2. Contactor shall contact Public Service of New Hampshire to remove the invasive plants from their guy wires and poles.

   a. Mechanical methods may be used to remove plant material.
   b. Removal perimeter shall extend no less than 20 + ft. beyond the leading edge of invasive species stand.

c. Excavation shall extend to a minimum depth of 2 ft. below proposed final grade. Excavated area shall be backfilled with uncontaminated suitable material.

3. Manual control techniques include activities such as hand-pulling, digging, mulching. These techniques work best on small populations. Manual control efforts must be persistent and several treatments may be needed to reduce or eliminate the target population.

4. Digging/Hand-pulling
Remove entire root to prevent re-sprouting; usually works best with small or young plants, in sandy or loose soils, or when soils are damp.

DISPOSAL OF MATERIAL

Only hand cut plant material shall be placed in (4 mil minimum thickness) black plastic bags for transportation out of the area. Bags shall be securely tied or sealed. Soil containing seeds, roots and/or rhizomes shall be wrapped in black plastic sheeting (4 mil minimum thickness) and transported in a manner which prevents the spread of the contaminated material during transport. Acceptable disposal is as follows:

- **LANDFILL** - Plant material or spoil containing invasive plant material shall be disposed of in a municipal solid waste management facility.

Stockpiling and stockpile location(s) of soil containing invasive plant material shall be approved by the City of Nashua. Invasive species spoil stockpiled on site shall be identified as such so not to be inadvertently used in a manner that is not consistent with *Disposal of Material*. Stockpiles shall be stabilized to prevent erosion and transport of invasive material. Stockpiling shall be at no cost to the City of Nashua.

The contractor shall identify, and dispose, of the materials that are removed from the site to the City of Nashua landfill. The Contract shall coordinate with the City of Nashua's Planning Department.

EQUIPMENT CLEANING

Equipment used in areas containing invasive plant species shall be power-washed (1000 psi minimum) and cleaned with clean water (without using cleaning soaps or chemicals) before leaving the invasive control/removal area to prevent the spread of seeds, roots, or other viable plant parts. Water may be supplied by a municipal water source or may be pumped from an on-site or local surface water source. If sufficient space is not available or precluded by terrain to provide a cleaning station on site, upon approval by the City, equipment used within an infested area may be power- washed adjacent to the invasive control/removal area, provided that the wash water (including spray) does not discharge within 100 ft. of any stream, existing or proposed wetland, or stormwater conveyance (egg: ditch, catch basin, etc.). If upon completion of construction, the area remains infested with invasive plants, the invasive material generated may remain in the infested area.

CARE OF CONTROLLED AREAS DURING CONSTRUCTION

The City of Nashua will inspect all disturbed areas approximately every 4 weeks during the growing season (or during the following growing season for fall applications if contract continues into the following growing season). If additional actions are necessary, the contractor shall remove any additional material by hand to all identified areas within 10 calendar days of notification.

END OF SECTION

8 SPACE ASPHALT PARKING AREA

A. SCOPE OF WORK

This work shall consist of constructing four inch (4") depth of the asphalt, of hot bituminous pavement as shown on the plans by the City of Nashua. Work includes furnishing, placing, and cleanup work associated with the installation of the trail. The trail shall have a maximum cross slope of 2% (1/4" per foot), and installed on a properly graded, 95% compacted bed of 6" of crushed gravel sub grade. All voids that require more fill shall be filled and compacted as a part of this contact.

B. MATERIALS AND CONSTRUCTION

The Contractor shall furnish all materials, labor and equipment necessary for constructing bituminous trail in accordance with relevant provisions of Section 608 and Section 401 of the NHDOT Standard Specifications for Road and Bridge Construction, latest edition.

The contractor shall place all the gravel or crushed gravel, in accordance with relevant provisions of Section 304 of the NHDOT Standard Specifications for Road and Bridge Construction, latest edition.

C. JOB CONDITIONS & MINIMUM TEMPERATURES

1. No asphalt concrete surface course shall be placed when the ambient temperature is less than 50° F. All compaction shall be completed before the temperature of the mixture drops below 200°F.
2. All longitudinal joints shall be "hot" joints; and shall finish a run without cool joints.
3. All asphalt courses shall be placed by means of an approved self-propelled asphalt paving machine. Contractor may place lower courses and compact all courses with equipment.

D. CLEANUP

Upon completion of asphalt paving and surfacing operations, the entire work site shall be cleaned of all waste, rubbish, and construction debris of any nature.

END OF SECTION

GRANITE CURB

SCOPE OF WORK

The contractor shall be responsible for installing new granite curbing, in accordance with these specifications and in close conformity with the lines shown on the contract drawings and as approved by the City of Nashua.

GRANITE CURBING

A. New granite curbing shall meet the requirements of the NHDOT Standard Specifications for Highways and Bridges,

B. Transition curbing shall be placed at the ends and beginnings of curbing, at drain inlets, and at handicap ramps.

C If curb, curb corners, or curb inlets of different quarries are used, curbing of each quarry shall be segregated and set together to give a uniform appearance.

EXECUTION

EXCAVATING TRENCH

The trench for the curb shall be excavated to a width of eighteen (18) inches. The sub-grade of the trench shall be at a depth below the proposed finished grade of the curb equal to six (6) inches plus the depth of the curbstone.

PREPARATION OF FOUNDATION

A. The foundation for the curbing shall consist of a crushed stone bed placed on the gravel sub base as shown on the details.

B. The foundation for curb inlets shall consist of a full bed of crushed stone on the supporting back wall of the catch basin or gutter inlet and with sufficient gravel on each side to support the overhang. The trench for the gravel foundation shall be at least six (6) inches in depth and eighteen (18) inches in width. This trench shall be filled with gravel and thoroughly tamped to the required grade.

C. The trench for curb comers shall be excavated so that there is a foundation of gravel which, when thoroughly compacted, will be six (6) inches in depth and extending six (6) inches beyond the front and back of the curb corner to the full depth of the foundation.

SETTING CURBING

A. Curb and curb corners shall be set on a crashed stone as shown on the contract drawings, and shall be fitted together as closely as possible.

B. All spaces under the curb and curb corners shall be filled with crashed stone so that the curb and curb corners will be completely supported throughout their length.

END OF SECTION

3" X 8' WIDE ASPHALT TRAIL WITH 12" STONE BASE

SCOPE OF WORK

This work shall consist of constructing three inch (3") depth of the asphalt, eight feet (8'-0") wide trail of hot bituminous pavement as shown on the plans by the City of Nashua. Work includes furnishing, placing, and cleanup work associated with the installation of the trail. The trail shall have a maximum cross slope of 2% (1/4" per foot), and installed on a properly graded, 95% compacted bed of 12" of crushed gravel sub grade. All voids that require more fill shall be filled and compacted as a part of this contact.

A. MATERIALS AND CONSTRUCTION

The contractor shall furnish all materials, labor and equipment necessary for constructing bituminous trail in accordance with relevant provisions of Section 608 and Section 401 of the NHDOT Standard Specifications for Road and Bridge Construction, latest edition.

The contractor shall place all the gravel or crushed gravel, in accordance with relevant provisions of Section 304 of the NHDOT Standard Specifications for Road and Bridge Construction, latest edition

B. JOB CONDITIONS & MINIMUM TEMPERATURES

1. No asphalt concrete surface course shall be placed when the ambient temperature is less than 50° F. All compaction shall be completed before the temperature of the mixture drops below 200°F.
2. All longitudinal joints shall be "hot" joints; the contractor shall finish a run without cool joints.
3. All asphalt courses shall be placed by means of an approved self-propelled asphalt paving machine. Contractor may place lower courses and compact all courses with equipment.

C. CLEANUP

Upon completion of asphalt paving and surfacing operations, the entire work site shall be cleaned of all waste, rubbish, and construction debris of any nature.

END OF SECTION

CULVERTS

SCOPE OF WORK

Work consists of furnishing and installing extending culverts, including excavation and backfill, selecting and hauling of materials, and constructing catch basins, and headwalls cleaning out existing culvert and videoing the existing for integrity.

EXCAVATION AND EMBANKMENT

Perform excavation and embankment shown on the drawings or as designated on the ground.

PLACEMENT

Place culverts to provide for unobstructed inlet and outlet flow. Remove logs, debris, soil, rock, and other obstructions above and below the culvert that would impede flow into the culvert or away from the trailway. Minimize disturbance to streambeds. Construct a leaching catch basin to facilitate flow from trail and surrounding area

PIPE CULVERTS

Install pipe culverts at the locations shown on the drawings or as designated on the ground. Place skew ditch relief culverts as staked to provide a downgrade equal to or greater than the uphill ditch. Place culverts at stream crossings in the natural streambed on stream grade. Attach end sections to the pipe by connecting bands or other means as recommended by the manufacturer.

BEDDING

Excavate and remove all unsuitable material and rocks over 3" to a minimum depth of 6" below the pipe invert and to a minimum width of 1.5 pipe diameters. Bed pipe with compacted suitable material free of rocks larger than 3" and in a stable foundation of undisturbed or compacted soil. Make the bed shaped to fit the lower quadrant of the pipe exterior and provide uniform continuous support along the entire length of the pipe.

Firmly embed selected sidewall rocks below the natural ground or streambed as shown on the drawings. Use flat cover rocks long enough to bridge between outside faces of the sidewalls. Select and place rocks so as to fit snugly with firm bearing on underlying rocks. Fill voids with small rock to prevent entry of soil into the culvert.

BACKFILLING CULVERTS

Backfill and compact around culverts with suitable material that is free of rocks over 3". Provide for the cover height as shown on the drawings.

HEADWALLS

Install headwalls at the locations shown on the drawings or as designated on the ground. Provide a compacted bench as a foundation for the wall.

Select rocks that have a general rectangular shape with flat top and bottom faces. Place the largest rocks on the bottom. Lay each rock stable on the course that supports it, interlocking with surrounding rocks. Do not break, jar, or displace rocks already set. Place the exposed face of each rock parallel to the face of the wall. Stagger vertical joints a minimum of 4" horizontally from vertical joints in adjoining courses.

END OF SECTION

EXISTING TRAIL RESTORATION

SCOPE OF WORK

Work consists of restoring the original trail including clearing, and berm, borrow, filling ruts and troughs, reshaping back slopes, excavation, reshaping trail tread, restoring drainage and other trail structures, constructing check dams, and removing protruding rocks, roots, stumps, slough, and berets.

CONSTRUCTION

CLEARING AND GRUBBING

Clear and grub as shown on the drawings.

EXCAVATION AND EMBANKMENT

Excavate and place all excavated material in accordance with the requirements as shown on the drawings

ROCK AND ROOT REMOVAL

Uniformly scatter the removed rocks and roots below the trailway and distribute to ensure no blockage of watercourses or creation of a windrow. Fill holes with suitable material and compact.

SLOUGH AND BERM

Removal and excess material: Use suitable slough and beret material within the trailway to restore the trail bed as shown on the drawings. Place all unsuitable and excess material beyond the downslope edge of the trail bed and uniformly spread to a depth not exceeding 4" so as not to obstruct drainage or interfere with the drainage of out sloped tread.

FILL MATERIAL AND BORROW

Use suitable material to fill ruts, troughs, and potholes in the tread that cannot be leveled and out sloped through performance of work in this sub section.

COMPACT AND SHAPE

Obtain borrow from areas shown on the drawings or designated on the ground.

DRAINAGE RESTORE DRAINAGE DIPS AND DITCHES

To reestablish drainage as shown on the drawings by removing obstructions such as rocks, roots, and sticks to make ditches and culverts free draining. Restore rock spillways in accordance with section as shown on the drawings.

STREAM, CHANNEL CLEANING

Clean channel of obstructions in areas shown on the drawings. Remove debris and rocks from the stream channel and scatter outside of the side slopes of the stream channel and beyond the clearing limits.

CHECK DAMS

When constructing, check dams for gullies, use dimensional lumber, sound peeled logs, or a row ofstones placed across the gully in the subgrade with the ends securely embedded in the banks as shown on the drawings and at locations staked on the ground.

USE SUITABLE MATERIAL FOR BACKFILL

As shown on the drawings, place and compact backfill to meet the density of the existing trail bed.

SWITCH BACKS

Restore switchbacks as shown on the drawings.

WATER BARS

Restore water bars in accordance as shown on the drawings. Reestablish drainage by removing accumulated material and replacing loose or missing rocks, unsuitable logs, and deteriorated rubber belting.

TURNPIKES

Restore turnpikes as shown on the drawings by replacing missing, rotten, or loose retainer logs and stakes, or missing or loose retainer rocks. Back fill with suitable material.

TRAIL STRUCTURES

Restore all trail structures at locations shown on the drawings or designated on the ground.

RESHAPING AND FINISHING TRAIL BED AND BACK SLOPES

Provide a firm and uniformly finished trail bed in accordance with cross-sections shown on the drawings. Provide a uniform and roughened surface on disturbed back slopes in accordance with cross• sections shown on the drawings. Gut all roots flush.

END OF SECTION

MODULAR TRAIL STRUCTURES LLC

Modular Trail Structures Steel Truss Bridge Specifications (See Sheet 11)

MATERIALS

8' Wide Frames for Marine Grade Pressure Treated or IPE Decking.

A. GALVANIZED STEEL

1. Post fabrication the entire frame assembly is hot dipped galvanized with a minimum of 3.9 micron thickness of zinc based galvanizing.
2. Frames are then hand rasped and cleaned to remove any sharp edges without compromising the galvanizing integrity.

B. BOARDWALK FRAMES

1. All frames meet or exceed International Building Code requirements of 100 pounds per square foot load capacity.
2. Walkway perimeter frame members fabricated with ASTM A500 Structural Steel for 8' widths.
3. Perimeter frame members are enclosed with the flexible hinge mechanism.
4. In-fill frame is fabricated with ASTM A500 Structural Steel spaced at proper distances for specified decking materials.
5. Support legs fabricated with ASTM A500 Structural Steel Tubing for both 6' and 8' Widths.

6. Leg footplates are fabricated with plate steel. Size depends on organic composition of wetland soil.

C. DESIGN LOAD

1. Boardwalk shall be designed for an evenly distributed load of 100 pounds per square foot as required by AASHTO. Boardwalks shall also be designed for occasional maintenance vehicle. Example: golf cart, recreation vehicle, maintenance vehicles. The vehicle design load shall be 2,500 pounds plus 30% impact. Load shall be distributed as a 4 wheel vehicle load.

D. MATERIALS

1. Frame material galvanized steel.
2. Welding materials shall be in accordance with the American Welding Society (AWS). Structural welding code D1.1 filler metal as specified in 4.1 shall be used for the welding process required.
3. Decking thickness should provide a load capacity of 100 pounds per square foot. Decking shall be as specified by customer.
4. Spacing of deck boards should meet American with Disabilities Act code (ADA).

END OF SECTION

TIMBER BOARDWALK

SCOPE OF WORK

This work shall consist of furnishing all materials and constructing timber boardwalk to the lines and grades designated in the field or as directed by the Planning Department, including fabricating, erecting, in the construction drawings.

MATERIALS

Timbers shall be pressure treated marine grade 1 or better with a minimum Fc of 1200 psi, and shall conform to AASHTO Standard M 168 for Wood Products. Preservatives and Pressure Treatment Process shall be in accordance with AASHTO Standard M 133 and American Wood-Preservers' Association (AWPA) standards. All pressure treated timber components shall be free of arsenic and shall be an appropriate Alkaline Copper Quaternary (ACQ) formation for the selected wood materials with minimum retentions of 4 kg/m' (0.25 lbs/fr') or 6.4 kg/rn' (0.4 lbs/fr') for wood used above ground or in ground contact, respectively. All timber should be select structural material dressed cut S4S (surfaced four sides), except timber decking shall be cut S1S2E with rough face placed upward to improve traction. Where adjacent to a pedestrian bridge, timber decking materials shall match materials used for pedestrian bridge decking.

All fasteners to be in accordance with AASHTO Standard M 253 and shall be appropriate for selected timber and associated treatment methods.

CONSTRUCTION

Equipment shall operate within the Limits of Disturbance in a manner to minimize impacts to root systems of adjacent existing trees to remain. When clearing for boardwalk construction, trees are to be cut off flush with finished grade. Grubbing under the boardwalk is not required assuming an average height of 3 feet from the underground tip of the pier to the bottom of the boardwalk support timber.

END OF SECTION

LEACHING BASIN

This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to clear the work area of unwanted shrub, unwanted soil and plant material, and prepare the work area for the installation of a trail.

LEACHING BASIN

A. Leaching Basin Configuration:
   1. Leaching Rings: (6) foot O D (outside diameter) with 5 inch walls and nominal 1 x 6 inch drainage openings. Effective depth of the leaching basin(s) shall be as specified herein or as indicated on the drawings.
   2. Circular Footing Ring: 8 inches thick and of required diameter for leaching ring specified.

B. Cover:
   1. Flat slab top.
   2. Solid wall dome.
   3. Sanitary drain dome with 1 x 6 inch nominal slotted drainage openings.
   4. The cover shall have a 24 inch clear access manhole opening. The access opening shall be provided with reinforced slab or tapered plug cover.

C. Pipe Connections Openings: Cut or cast opening 2 inches larger than the outside diameter of the connecting pipe.

MISCELLANEOUS MATERIALS

A. Concrete for Precast Structures: Air content 6 percent by volume with an allowable tolerance of plus or minus 1.5 percent. The concrete shall meet a minimum compressive strength, 4,000 psi after 28 days.

B. Reinforcing Steel:
   1. Welded Wire Fabric: ASTM A497.
   2. Steel Bars: ASTM A615.

C. Access Manhole Frames and Covers:
   1. Frames: square, cast iron, minimum weight 380 pounds. Unless otherwise indicated, the frame shall be 9 inches high with a minimum 21 inch clear opening.
   2. Covers: Cast iron, 1-3/4 inches thick, minimum weight 160 pounds, reinforced or ribbed on the underside and without perforations. The top surface shall be checkered and provided with suitable lifting notches.
   3. Machining: Seats of manhole frames and covers shall be machined to a horizontal bearing surface.

D. Precast Reinforced Concrete Manhole Riser Sections: ASTM C478.

E. Manhole Brick: ASTM C32, Grade MS.

F. Concrete Masonry Units for Manholes: ASTM C 139.

G. Butyl Rope Sealant: Federal Specifications SS-S-210A.

H. Mortar: ASTM C270, Type M.

I. Non-shrink Grout: Water Plug, Hallemite Manhole Pipe Cement or grout utilizing Sika Set.

J. Pipe and Fittings (for equalization pipe): Ductile iron - ANSI/ASTM A-746, Service weight cast iron - ASTM A-74, clay or concrete pipe meeting or exceeding Class 2400 sewer pipe strength requirements.

K. Pipe and Fittings: Cast iron soil pipe, ASTM A74.

L. Coal Tar Epoxy Coating: Two component, polyamide cured, 68 percent solids by volume. Acceptable Coating: Hi-Mil Sher-Tar B6940 by the Sherwin-Williams Company.

M. Cast-In-Place Concrete (for encasing siphons): 5 percent air entrained 3000 psi minimum compressive strength.

PAVEMENT MARKING

SCOPE OF WORK

The work shall consist of furnishing and placing white reflectorized paint pavement markings, for crosswalks and parking lot striping of all locations as directed by the City's Planning Department.

METHODS OF CONSTRUCTION

A. Latex base paint shall conform to 708-NH 4.11 and Federal Specifications TM2226 white and yellow Traffic Paint. Item # 800057544

Dealer: Sherman William
176 Daniel Webster Hwy
Nashua, NH 03060
Phone # (603) 888-0063

B. All pavement markings of the type specified shall be applied at the locations as determined by the City of Nashua's Planning Department.

C. Longitudinal lines placed on tangent roadways segments shall be straight and true. Longitudinal lines placed on curves shall be continuous smoothly curved lines consistent with roadway alignment. All pavement markings placed shall meet the tolerance limits in accordance with manufacturer's recommendations.

D. Unless otherwise specified, widths of longitudinal markings shall be as follows:

Crosswalks
Parking lot striping

E. Newly painted markings shall be protected from traffic until the paint is cured. The method of protection shall not constitute a hazard to the traveling public. Damage to any markings as a result of tracking shall be repaired by the contractor.

F. All equipment used for highway striping shall be specifically designed for that purpose by a company experienced in the design and manufacture of such equipment. Equipment used for longitudinal lines shall be truck mounted, and shall have the capability of placing two 4-inch green trail lines simultaneously according to the dimensions shown in the specifications. The paint shall be applied with an atomizing spray type striping machine. The equipment shall include a mechanical glass bead dispenser mounted not more than 12 inches behind the paint dispenser. All equipment shall be kept in good operating condition.

G. Immediately before applying the pavement marking paint to the pavement, the contractor shall insure the surface is dry and entirely free from dirt, sand, grease, oil, or other foreign matter.

H. The surface temperature of the pavement shall be a minimum of 50 degrees.

I. Paint shall be applied at the following flow rates per gallon for the widths of line specified: 4 inch wide line, 300 - 350 linear feet for solid lines.

J. All cleanup and disposal of solvents, residue, and the like shall be the responsibility of the contractor and shall be performed in accordance with all applicable federal, state and local requirements.

TRAFFIC CONTROL

Traffic control shall be the responsibility of the contractor. Traffic control shall comply with the Federal Highway Administration Manual on Uniform Traffic Control Devices Part VI, Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations. Contractor must maintain traffic flow; total street closures are not allowed.

METHOD OF MEASUREMENT

This work shall be measured by the linear footage of longitudinal reflectorized pavement markings, on the surface of the markings, for the type and width specified.

FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the site.

END OF SECTION

TRAIL SIGNS

NOTE: CITY OF NASHUA SHALL SUPPLY THE SIGNS AND POSTS

TRAIL SIGNS

Description: The work shall consist of installing signs. See plans for locations. The Planning Department shall approve location in the field. All necessary brackets and mounting hardware shall be provided by the contractor. Exposed hardware shall be in black color. All signs shall be aluminum sheeting shown on the plans;

For all signs except the Pedestrian Directional, signs shall be fastened to posts hardware shall be tamper proof and anti-theft. Bolt-holes in the aluminum sheeting for sign mounting shall not be placed in locations that conceal the sign graphics or make any of the lettering illegible.

Pedestrian signs shall be fabricated with an integrated aluminum mounting bar designed to fit securely within the channel of the Fluted Channel Poles, as shown on the plans. A removable set-screw shall be used to fix the lowest sign panel into position within the channel. All other sign panels will rest atop the lowest panel.

For bolt diameters greater than or equal to 3/8 inch the diameter of the bolt hole shall be not more than 1/16 inch larger than the nominal bolt diameter.

END OF SECTION

CARMANAH R920 SERIES RECTANGULAR RAPID FLASHING BEACON

NOTE: CITY OF NASHUA SHALL SUPPLY RAPID FLASHING BEACONS

SCOPE OF WORK

The work shall consist of installing 3 units at 3 crosswalk locations. This section includes furnishing of all labor, material to construct sign bases, equipment to install this safety feature.

OVERVIEW: This specification is for the Carmanah R920 Series Rectangular Rapid Flashing Beacon (RRFB).

Each unit shall consist of a self-contained solar engine that houses the energy management system, on-board user interface, wireless communications, batteries and solar panel. Each unit shall include either one or two RRFB light bars with optional side emitting pedestrian confirmation light(s). The system shall conform to all provisions of the MUTCD, Interim Approval IA-11.

MECHANICAL SPECIFICATIONS

The solar engine shall be constructed from aluminum and shall be no greater in size than 13.6" L x 3.6" D x 17.8" H (34.5 cm x 9.1 cm x 45.2 cm). The Solar panel shall be integrated to the solar engine. All batteries and electronics shall be mounted in the solar engine, with no external control cabinet or battery cabinet required. A hinged lid shall provide access to the interior of the engine. The solar engine shall be vented to provide cooling of the battery and electronic system.

The overall weight of the solar engine assembly shall not exceed 20 lbs. (9.1 kg).

The solar engine shall be supplied with a fixed tilt angle and shall be able to be oriented south with no additional mounting hardware.

The light bar housing shall be constructed from aluminum and shall have the approximate dimensions: 24" L x 1.5" D x 4.5" H

The light bar shall be mounted to the pole using a separate bracket assembly to facilitate mounting two light bars back to back (bi-directional) and to allow the light bar to pivot. The light bar shall be able to pivot by approximately 40 degrees in order to aim the light bar independent of the wire whole location on the pole.

The light bar bracket shall be constructed from 3/16" galvanized steel and shall have both banding and bolting mounting options and shall be able to be mounted to all specified pole types.

The light bar assembly shall open for access to the wiring connections for the LED indicators. LED indicators shall be rated to MIL-STD-810F, Method 506.4 for ingress protection.

MOUNTING

2", 2.5" Perforated Square Post Mount:
The size and weight of the solar engine shall be appropriate for mounting to standard two inch sign posts. The solar engine and light bar assemblies shall be furnished with mounting hardware for mounting to standard 2" to 2.5" Perforated Square Poles.

2 3/8" – 2 7/8" Diameter Round Post Mount: The size and weight of the solar engine shall be appropriate for mounting to standard two inch sign posts. The solar engine and light bar assemblies shall be furnished with mounting hardware for mounting to standard 2 3/8" – 2 7/8" Diameter Round Poles.

4" – 4.5" Diameter Round Post Mount: The solar engine and light bar assemblies shall be furnished with mounting hardware for mounting to standard 4" to 4 ½" Diameter Round Poles.

CONFIGURATION

The solar engine shall house an on-board user interface that provides on-site configuration adjustment, system status and fault notification, and system activation information.

The flash duration shall be adjustable in-the-field to one second increments.

The system shall provide configurable night time intensity settings and shall be able to enable and disable low ambient light dimming.

Flash duration and other in-the-field adjustable settings shall be automatically broadcast to all units in the system, except channel selection which shall be configured on each unit.

SOLAR / BATTERY SYSTEM

The solar engine shall include one 10-watt solar panel no larger than the footprint of the housing and shall have a hinged top to provide access to the on-board user interface and batteries. The solar engine shall house two 7 Ah sealed valve regulated lead acid batteries. Batteries shall have quick connections to facilitate installation and be readily available from multiple suppliers and non-proprietary. Solar panel and battery system shall be 12 Volt DC.

OPERATIONAL SPECIFICATIONS

The intensity of the yellow indications directly perpendicular to the lens shall be a minimum of 1,800 Candela at full sun daylight conditions. The intensity shall be able to adjust to ambient light conditions, however during daylight operation the intensity shall meet the minimum specifications of the Society of Automotive Engineers (SAE) standard J595 Class I dated January 2005.

The color of the yellow indications shall meet the specifications of SAE standard J578 (Color Specification) dated December 2006.

The solar engine shall have the capacity to operate 300, 20 second activations per day year round with a minimum solar insolation of .94 sun hours per day.

The system shall have the capacity to operate 900, 20 second activations per day year during summer conditions with a minimum solar insolation of 5.8 sun hours per day.

The solar engine shall have the capability to activate other solar engines by wireless communications within 500 feet (152m). The solar engine shall have unique channels that can be configured on-site to avoid activation of nearby systems.

The system shall be dimmable during night time conditions using a light sensor.

ACTUATION

A. The system shall be actuated by pedestrian push buttons that shall have an LED indicator with audible tone with Piezo control and shall be ADA compliant and MUTCD-2009 4E compliant for momentary operation.

B. All RRFBs in the system shall initiate activation simultaneously within 150mS of actuation.

C. If an additional actuation occurs while the system is activated, the flash duration shall reset. For example, with the flash duration set to 20 seconds, if an additional actuation occurs after the RRFB has been activated for 15 seconds the RRFB will continue for an additional 20 seconds, or 35 seconds in total. If the RRFB has ceased operation, any subsequent actuation shall activate the RRFB without delay regardless of how recently the RRFB ceased operation.

ENERGY BALANCE AND AUTONOMY CALCULATIONS

- The manufacturer shall provide an energy balance worksheet consisting of (Energy In) Energy Out) and System Autonomy.
- Energy-In is based on Electric charge, in Ah, entering the battery from the charger, accounting for:
- The electric charge from the solar panel based on a minimum of .94* sun-hours for a south-facing panel tilted 45°.
- Efficiency losses from the charger, including conversion efficiency of a Maximum Power Point Tracking (MPPT) Charger, where applicable.

- MPPT Charger current boost, if applicable.
- Battery coulombic efficiency losses
  Energy-Out is based on the sum of quiescent and operating load in all circuitry over 24 hours with an operating capacity of 300, 20 second activations, including:
- Baseline wireless over 24 hours
- Operating load of push button or passive detection at rated operating capacity per activation
- Additional operating load of the wireless system per activation
- Operating load of light bars including pedestrian indicators at rated intensity per activation
- System Autonomy shall be a minimum of 15 days, based on Battery Capacity divided by Energy-Out per day (as calculated above).
- *.94 sun-hours is the minimum monthly average insolation for Seattle WA with the optimal panel tilt of 45°.

PACKAGING

Packaging must consist of only recyclable corrugated cardboard and soft plastic bags. Each system must ship in one complete box no larger than 3.6 cubic feet (0.1 cubic meters) and weighing no more than 40 lbs. (18 kg).

Manufacturer: Carmanah Technologies Corp.
Model: R920 Series RRFB
Toll Free: 1-877-722-8877
www.carmanah.com

END OF SECTION

TRAILHEAD KIOSK

NOTE: CITY OF NASHUA SHALL SUPPLY 5 KIOSKS

GENERAL

SCOPE OF WORK:

A. This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to install 5 trailhead kiosks,

PRODUCTS

• Units to be standard per website description: Metal roof, white oak posts, Mission Brown stain on plywood, all other parts natural/unfinished.
• Plexiglas signboard to be included on all units – picture frame will be on the plywood signboard; Plexiglas, bottom sign rail and screws will be packed separately.
• Units will be partially assembled as follows
1) complete roof assembly
2) Legs, crossbars, signboard with picture frame as above
3) 2 curved pine braces
4) 2 pegs to connect roof to legs
5) 4 5" s/s screws with copper washers to affix legs
6) Plexiglas, bottom sign rails, screws wrapped as a package
• Assume all drop-off's are at a single central location accessible with truck and trailer, and there will be personnel/equipment to assist with unloading.
• City of Nashua will dig holes, trim legs to final length, erect leg / signboard assemblies, lift roofs onto top tenons, peg together, screw on the braces, and install the Plexiglas and picture trim.

END OF SECTION

SOLAR LIGHTS & COLLAPSIBLE BOLLARDS

GENERAL

REFERENCES AND STANDARDS

A. Examine all drawings and all other Sections of the Specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section.

B. Coordinate work with that of all trades affecting, or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the contract.

SCOPE OF WORK

The work of this Section consists of furnishing and installing all site improvements and related items as indicated on the drawings and/or as specified herein and includes, but is not limited to, the following:

1. Parking lot Solar lights
2. Kiosk Solar Light Bar
3. Collapsible Bollards

SOLAR LIGHTS FOR PARKING LOT

NOTE: CITY OF NASHUA SHALL SUPPLY 4 LIGHTS AND POLES

SL15
SOLAR 'RICHMOND' LED STREET LIGHT
(WITH 13' / 16' POLE)

SCOPE OF WORK

A. This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to install 5 trailhead kiosks,

GENERAL

Operating voltage is 24v. DC. Special control system to prevent over-charging and over-discharging. Corn Bulbs offered ranging from 10-30W at 24V. Par Bulbs offered ranging from 12-18W at 24V. Illumination time is up to 12 hours or more generally dusk to dawn (subject to the specification of the system selected). Up to 3 day's autonomy (reserve power) to allow for successive cloudy weather and days without sunshine (subject to the specification of the system selected).

BATTERY CAPACITY

24v DC system, with two 12v sealed lead acid ACM or GEL type rechargeable batteries. Battery capacity is from 18 Amp-Hr. to 55 Amp-Hr. per battery; subject to the specification of the system selected .Battery dimensions vary subject to battery capacity. Battery weight will vary subject to battery capacity.
Typical battery life is approximately 3-7 years subject to environmental factors. Alternative battery types, capacities, and sizes may be available upon request.

CHARGE CONTROLLER/TIMER (PROGRAMMABLE CONTROL MODULE)

This system includes a programmable control module which regulates and manages the solar Panel input, battery charging and discharging, and system activation (illumination timer).

The compact control module has LED indicators to display status or charge, input connections for solar panel and batteries, and output connections for the lamp. Features push button programming.

Accepts and controls AGM and Gel type sealed lead acid (VRLA) batteries. Low voltage disconnect regulated by state of charge or battery voltage. Detects daytime and night time conditions via the solar panel input. Automatic adaption to ambient temperature conditions. Automatic voltage recognition. Float voltage for 24v system is 27.4v de. Low voltage disconnect for 24v system is 22.8 - 23.8v de. Reconnect voltage for 24v system is 25.6v dc. Dimensions approx. (4" x 4" x 1.5") Ambient temperature range -40 deg C-+50 deg C (-40 deg F -+122 deg F). Programmable lock-out feature for optional use to prevent accidental or unauthorized tampering. User programmable illumination time of up to 1to12 hours or dusk-to-dawn setting (where conditions permit). Default setting is typically dusk to dawn. User or installer can set the control module to run from dusk and then shut off after a certain amount of hours. For example from dusk for 4 hours then switch off, or run from dusk for 6

SOLAR PANEL

Highly efficient polycrystalline solar panel with low reflecting tempered glass and aluminum frame with anti-aging, and encapsulation. The color is a black finish to solar panel frame, panel face, and backing. The solar panel is supplied with support frame and hardware to attach to the top of the pole. The hardware includes a steel tenon that is approximately 16" tall. Wattage of solar panel is subject to the specification of the system and the solar panel wattage has no effect on the illumination output of the lamp.

Wattage available 45w, 7ow, Standard panels is 45w and 7ow. Typical solar panel life is approximately 20-25 years subject to environmental factors. The geographic location of the street light may affect the size/wattage of the solar panel required.

LAMPSHADE & BULB

Edison bulb holder will accept E26/E27 12-24V volt LED bulb (typically corn or PAR style).Corn Bulb Flux approximately 1000 Lumens (10W), 2000 Lumens (20W), or 2900 Lumen (30W). Par Bulb Flux approximately 1200 Lumens (12W), 1500 Lumens (15W), or 1800 Lumen (18W). Custom LED Board models are available by special order with 144SMD (10W), 288SMD (20W), and 504SMD (30W).All SMD/LED's bulbs are white at approx. 6oook color temperature. Amber or white/amber or other LED color temperatures possible, via special order only and at extra cost .SMD/LED bulb life is typically up to 100,000 hours or equal to about 22 years. Thus the light bulb should never have to be changed.

POST/ POLE

The pole is galvanized steel which attaches to the top of the battery box cabinet. Pole surface has a turned (fluted) rib design; pole has a square flat base (flat plate) with pre-drilled holes for bolting directly to the battery box cabinet. Wind load rating for pole is 110 MPH with a 1.3 gust factor. Pole height is approx. (4 meters).

END OF SECTION

SOLAR LIGHT BAR

NOTE: CITY OF NASHUA SHALL SUPPLY 5 KIOSKS

FL17

SOLAR 'MULTI-PURPOSE' 144 LED BUS SHELTER LIGHT SYSTEM

SCOPE OF WORK:

A. This section includes furnishing of all labor, materials, equipment, safety and environmental protection, and incidentals necessary to install 5 trailhead kiosks,

Customer has the choice of 1 single tube bus shelter light, 2 single tube bus shelter lights, 1 double tube bus shelter light, 2 double tube bus shelter lights, or a combination of 1 single tube bus shelter light and 1 double tube bus shelter light. (Illumination times may *vary* with tube choice.)

Each LED tube is fitted with 144 super-bright Cree® SMD/LED's providing approx. 1152 Lumens (Per tube).

Each SMD/LED provides 8 Lumens and each tube has a power consumption of just 33omA.

There is vandal resistant polycarbonate lampshade.

The LED tube lamps are replaceable if required and have a typical lifespan of *over* 50,000 hours.

Each tube light fixture has approx. 13' of pre-wired cable which is pre-plugged ready for easy connection to the battery box.

The LED tube tights are weather rated to LP 65. All connections are simply plug & play.

The kit is supplied with compact stainless steel mounting brackets (clips).

Gray colored finish of tube light fixture with clear lampshade cover. Easy to install into almost any type of bus shelter. The units operate up to 12 hours, or more, during darkness, in ideal conditions, subject to the solar panel wattage and other factors mentioned below. Maximum continuous illumination time for a single tube tight fixture is up to approx. 28 hours, typically. Maximum continuous illumination time for a pair of single tube light fixture is up to approx. 14 hours, typically.

Maximum continuous illumination time for a double tube tight fixture is up to approx. 14 hours, typically... Maximum continuous illumination time for a pair of double tube light fixture is up to approx. 7 hours, typically. Maximum continuous illumination time for a single tube light fixture and a double tube light fixture is up to approx. 10.5 hours, typically. There is a user programmable illumination time of up to 1to12 hours or dusk-to-dawn setting (where conditions permit). Up to 24 hours of autonomy subject to time length of night time illumination.

BATTERIES & BATTERY BOX

A remote battery box is supplied to accommodate the batteries. Two, high capacity 12 volt, 17 Amp/Hr. or 18 Amp/Hr. sealed lead acid batteries are supplied. Batteries must be connected together in series. The battery box has a hinged lid which is lockable (padlock not included). The battery box has an integral battery shelf and also houses the programmable control module. The battery box also has two receptacles (sockets) for each LED tube light fixture to be connected.
Each battery is approx. 7" x 7" x 3"). The metal battery box is approx.17" x 14" x5".

SOLAR PANEL

High quality, aluminum framed, 45 watt solar panel fitted with weatherproof connecter which connects directly to the battery box with approx. 17' of cable.

PREFFERED SUPPIER

HEADQUARTERS ADDRESS:
5611 Halifax Avenue,
Fort Myers, Florida, 33912, USA.

BUSINESS HOURS:
Monday-Friday 10:00am – 4:00pm
(USA Eastern Time)

TELEPHONE: 1 239-461-5522
FAX: 1 239-337-7887

EMAIL: sales@solarilluminations.com

Two special triangle shaped mounting frames are included to allow the solar panel to attach to a vertical or horizontal surface with two hole pre-drilled into each section of the frame. Two special mounting frames are included to allow the solar panel to attach to a vertical or horizontal surface with two hole pre-drilled into each section of the frame. Typically about 4-5 hours of sunshine daily is required to enable full charge, subject to the solar panel wattage and other factors mentioned below.
45w solar panel dimensions approx. 34.5" x 20" x 1.5. Size may vary depending upon solar panel wattage. The solar panel support/mounting frame (as supplied), if used, requires a footprint of approximately 32" x 15" The solar panel support brackets are triangular in shape and have a face length approximately 19", a stand-off of approx.10" and a fixing length of approximately 17" (depending upon the solar panel wattage).

END OF SECTION

COLLAPSIBLE BOLLARDS

TRAFFICGUARD® SINGLE POST [LPHDHB] BOLLARDS

NOTE: CITY OF NASHUA SHALL SUPPLY THE COLLAPSIBLE BOLLARDS

SCOPE OF WORK

The work to be done under this section shall require the contractor to provide all labor, material, equipment and transportation necessary to install the collapsible bollards.

SECTION INCLUDES

Collapsible bollards & base plates

PART SPECIFICATIONS

ASTM A500 – bollard post
LPHDHB consists of 6" x 3" x 3/8" steel tube
ASTM A36 – bollard base plate
LPHDHB consist of 12" x 12" base plate
Stainless Steel - ¾" x 8" lock & hinge pins

PERFORMANCE REQUIREMENTS

Bollard will collapse to a 4 inch clearance (LPHDHB) or 5 inch clearance (HDHB) allowing vehicle traffic to pass.
Bollard locks City of Nashua shall supply.
Submittals document can be found at www.trafficguard.net under "document library" or enclosed with bollard purchase. Follow manufacturer's specifications and installation instructions as required.

QUALITY

Bollard and base plate must be supplied by TrafficGuard to provide consistent quality in appearance and performance.

DELIVERY, STORAGE AND HANDLING

Inspect materials upon receipt ensure that the correct materials have been received and that they are in good condition.

If not installing immediately, store units to avoid damage from other construction activities an elements.

PREFFERED SUPPIER

TrafficGuard Direct, Inc., P.O. Box 201, Geneva, IL 60134, Tel 877-727-7347, Fax 800-814-7194,
Website:http://www.trafficguard.net
The TrafficGuard Single post is available in two styles.
Architect should specify the following body style:
LPHDHB – 4" clearance, 30" height

FINISHES

a. All surfaces are primed with rust & corrosion resistant, zinc rich primer w/ 5,000 hour salt spray performance.
b. Standard finish, TGIC Polyester outdoor finish (Black).
TGIC Polyester powder definition; meets decorative and functional requirements for gloss retention, physical properties, chemical resistance and weather ability.

INSTALLATION

a. Comply with manufacturer provided instructions and drawings.
b. Provide LPHDHB anchor system of your choice.
c. Install LPHDHB base true and level on your selected anchor system using the flat washers and hex nuts included in your anchor system kit.
d. Install LPHDHB post to LPHDHB base using hinge bolt, flat washer, and hex nut. Tack weld hex nut to hinge bolt so it cannot be easily removed.
e. Install locking pin thru up position bollard post and install padlock.
f. If touch up painting in the field, be careful not to paint moving parts which may restrict the bollard's proper function.

SITE STORAGE AND PROTECTION

Upon receipt of bollard unit(s) all materials should be thoroughly inspected to ensure that all parts has been received in good condition. The contactor shall store the units in a dry location away from possible damage until the time of installation.

END OF SECTION

PLANTINGS FOR RAIN GARDEN

SCOPE OF WORK

The work to be done under this section shall require the contractor to provide all labor, material, equipment and transportation necessary for the furnishing and planting of shrub and perennial plants for the rain garden as described in the plans. Shrub and perennial planting shall happen before June 30 or after August.

APPLICABLE SPECIFICATIONS AND STANDARDS

a. **STANDARDIZED PLANT NAMES**, 1942 Edition, and American Joint Committee on Horticultural Nomenclature.

b. **AMERICAN STANDARD FOR NURSERY STOCK**, Z 60.1, latest edition, American Association of Nurserymen.

c. Standards of the Association of Official Agriculture Chemists regarding soil analysis.

d. The United States Department of Agriculture – 'Soil Classification System'.

SUBMITTALS

a. Inspection certificates for plant materials shall be submitted to the City of Nashua.

b. Samples and manufacturer's product data, as applicable, shall be submitted for the following materials:

1. Prepared planting mix.
2. Sphagnum Peat Moss.
3. Humus.
4. Organic Compost.
5. Mulch.
6. Stakes.

PERSONNEL QUALIFICATIONS

a. The planting shall be done by contractors regularly engaged in landscape construction work, specifically planting installation, and by skilled workers, trained and experienced in accepted horticultural/nursery practices. The work shall be done under the supervision of a qualified planting foreman with a minimum of three (3) years of experience in the landscape contracting profession and be able to provide references to the City of Nashua of past related project work.

PLANTING SEASON

a. Deciduous plants shall be planted only when dormant, either prior to bud breaks, before leaves appear in the spring, or subsequent to their loss in the fall, unless otherwise directed by the City of Nashua.

b. Evergreen plants may be planted either in the spring until new growth appears or at any time between September 15 and November 30.

c. If the construction completion date prohibits in-season planting, the contractor shall complete his work within the project date and prepare himself for out-of-season planting, including application and extra water. Plant guarantee periods remain as stated below. Frozen ground planting shall not be permitted.

TRANSPORTATION, DELIVERY, STORAGE AND HANDLING

a. Each plant shall be handled and packed in the approved manner for that species or variety and all necessary precautions shall be taken to insure that the plants arrive on-site in proper condition for successful growth. Trucks used for transporting plants shall be equipped with covers to protect plants from windburn during transport.

b. No plants shall be transported to the planting site that is not thoroughly wet through the ball of earth surrounding the roots. Any plants that are dry or in a wilted condition when delivered to the site will not be accepted and shall be replaced by the Contractor at his expense.

c. Plants shall be delivered only after preparations for planting have been completed. They shall be planted immediately upon arrival to the site. If planting is delayed more than six (6) hours after delivery, plants shall be heeled in, protected from sun, wind, weather and mechanical damage, and kept watered.

d. Packaged materials shall be delivered to the site in original unopened packaging showing weight, analysis and the name of the manufacturer.

MATERIALS

PREPARED PLANTING MIX

a. The prepared planting soil mix for all plant bed areas shall consist of the following materials and quantities:

1. Seven (7) parts loams borrow as specified in Section 31 00 00 - EARTHWORK of these Specifications.
2. One (1) part organic compost, humus, or peat.
3. Recommended amount of Agri-Form tables and Terra Sorb

SOIL AMENDMENTS

ORGANIC COMPOST

1. Compost shall be a standard commercial product comprised of fully decomposed, one hundred percent (100%) plant derived, natural organic matter. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Compost shall be free of sticks, stones, weed seeds, roots, mineral or other foreign matter and delivered air dry. It shall be free from excessive soluble salts, heavy metals, phytotoxic compounds, and/or substances harmful to plant growth and viability. Organic compost shall have an acidity range of 4.5 to 7.0 pH,

SPHAGNUM PEAT MOSS

1. Sphagnum peat moss shall be a standard, commercial product. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Peat moss shall be free of sticks, stones, weeds or weed seeds, roots, mineral or other foreign matter. It shall be free from toxic substances and/or compounds harmful to plant growth and viability. It shall be delivered air dry in standard bales and shall have an acidity range of 3.5 to 5.5 pH.

HUMUS

1. Humus shall be natural humus, reed peat, or sedge peat. Its composition shall furnish ample water holding capacity and cation exchange capacity for the retention of plant nutrients. Humus shall be free of sticks, stones, weeds, roots, mineral or other foreign matter and/or toxic substances harmful to plant growth and viability. It shall be low in wood content, free from hard lumps and excessive amounts of zinc and delivered air dry in a shredded or granular form. According to the testing methods of the AOAC, latest edition, the acidity range shall be 5.5 to 7.5 pH, and the organic matter content shall be not less than eighty-five percent (85%), as determined by loss on ignition. The minimum water holding capacity shall be two hundred percent (200%) by weight on an oven-dry basis.

FERTILIZER

1. Slow release tabs Agri-Form tablets or approved equal

2. Terra-sorb for moisture retention or approved equal.

WATER

a. Water shall be is available at the site for use, but costs associated with use of the water shall be born solely by the contractor. Hose and other equipment required for application of water shall be furnished by the contractor.

MULCH

a. Shredded softwood bark mulch shall be fibrous pliable slices, not exceeding one half (½) inch in width. It shall be ninety-eight percent (98%) organic matter with a pH range of 3.5 to 4.5 and a moisture content not to exceed thirty-five percent (35%). It shall be free of weeds, weed seeds, debris, phytotoxic compounds and materials harmful to plant growth and viability. Organic mulch shall be aged not longer than two (2) years.

PLANT MATERIALS

SELECTION OF NURSERY STOCK

1. At least twenty (20) days prior to the expected planting date, the contractor shall request in writing, that the City of Nashua provide a representative to select and tag stock to be planted under this Section. This request shall be made ten (10) days prior to the date on which stock selections are to be made. The contractor shall arrange for and bear the cost of transportation, meals in transit, and overnight accommodations, if necessary, for the City staff's representative during the period of time required to select and tag the required number of sized stock.

2. The letter of request shall also have attached a letter of certification from the supplier attesting to the availability of the required plants in specified sizes prior to requesting the City of Nashua staff to make plant source inspections.

3. Plants shall be selected by the City of Nashua's representative at the place of growth for conformity to specification requirements as to quality, size and variety. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of work. Any material so rejected shall be removed from the site immediately. Costs of replacements will be borne by the contractor.

4. All plants shall be legibly tagged with their proper Latin name (i.e., genus, species and cultivar) and size. The contractor shall supply the necessary tags or seals which shall be durable and capable of accepting weather-resistant ink or an embossed process. The tags or seals shall be attached directly and securely to each selected plant.

b. The contractor shall furnish and plant all plants shown on the drawings, as specified, and in quantities and sizes as designated on the plant list. No substitutions will be permitted.

c. All plants shall be grown in nurseries that have been inspected by the appropriate state agency and have complied with the regulations thereof. All plants shall comply with federal and state laws requiring inspection for plant diseases and pest infestations. Inspection certification, as required by law, shall accompany each shipment of plants, and certificates shall be submitted to the

owner. The contractor shall obtain clearance from the applicable governing agency, as required by law, before planting any plants delivered from outside the state in which they are to be planted. Evidence that such clearance has been obtained shall be submitted to the owner.

d. All plants shall conform to the American Standard for Nursery Stock of the American Association of Nurserymen, publication Z60.1. All trees and shrubs shall be typical of their species or variety and shall have a normal habit of growth.

e. The root system of each plant shall be well provided with fibrous roots. All parts shall be sound, healthy, and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs or larvae.

e. The Contractor shall take note that only plant stock grown specifically for hardiness in Zone 5 of the Hardiness Zones established by the Arnold Arboretum, Jamaica Plain, Massachusetts, will be accepted. The contractor's suppliers must certify in writing that the stock has actually been grown under Zone 5 conditions and is hardy or that the stock was asexually propagated from and grafted onto stock from a strain proven hardy to Zone 5 conditions. Trees and shrubs not so certified may not be accepted.

BALLED AND BURLAPPED PLANTS

1. All plants designated balled and burlapped or 'B & B' must be moved with the root systems as solid units with balls of earth firmly wrapped with biodegradable burlap and bound carefully with twine or cord. The diameter and depth of the balls of earth must be sufficient to encompass the fibrous root feeding system necessary for the healthy development of the plant. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during the process of planting, or after the burlap, staves, ropes or platform required in connection with its transplanting have been removed. The plants and root balls shall remain intact as a unit during all planting operations. All plants shall be freshly dug. No plants from cold storage or previously heeled-in will be accepted.

2. Soil characteristics (i.e., composition, texture, pH, etc.) of all field-grown balled and burlapped plants shall closely match that of the soil where plant materials are to be planted.

3. All balled and burlapped plants that cannot be planted at once must be heeled in, protected and watered

CONTAINER GROWN PLANTS

1. All container grown plants shall be well established in the container in which they are sold and shall have been acclimatized for at least one (1) growing season. Plants shall have a fibrous, healthy root system with sufficient roots to hold earth intact after removal from the container.

Plants shall have no girdling roots and shall not be in a rootbound condition. Plants shall remain in their container until planted.

2. All pruning cuts shall comply with acceptable horticultural practice.

ANTITRANSPIRANTS

a. No antitranspirants shall be used on-site

PESTICIDES

b. No pesticide shall be used on-site

HERBICIDES

a. No herbicide shall be used on-site

EXECUTION

PLANT LOCATIONS

a. All plant locations and outlines for planting beds shall be staked out on the ground and approved by the City of Nashua staff before any excavation is begun. If it is necessary to adjust any of the locations, because of unforeseen problems, the changes shall be under the direction of the City of Nashua's Planning Department and there shall be no extra charges for these adjustments.

PLANTING HOLE EXCAVATION

a. Planting holes for perennial and shrub planting shall be at root system; holes for shrubs shall be at least one (1) foot greater in diameter than the root ball. Planting holes shall not be deeper than the height of the root ball. The walls of the hole shall be sloped, wider at the top than at the bottom, and shall be scarified to eliminate glazing.

MAINTENANCE

a. Maintenance shall begin immediately after each plant is planted and shall continue until final acceptance of the project.

b. Maintenance shall consist of keeping plants in a healthy viable growing condition. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated, and otherwise maintained and protected. Settled plants shall be reset to proper grade and position, planting saucer restored and dead material removed. Stakes and guys shall be tightened and repaired. Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit.

c. Planting beds and individual plant pits shall be kept free of weeds. Mulch shall be replaced as required to maintain a three (3) inch depth. Beds and individual pits shall be neat in appearance and maintained to the original laid out lines.

d. Planting areas that have been compacted for any reason during planting operations and/or the maintenance period shall be recultivated by the Contractor, at his expense.

e. Sidewalks and other paved areas shall be kept clean during planting and maintenance operations.

g. Upon completion of planting, excess soil and debris shall be removed from the site, and all damage resulting from planting operations shall be repaired.

h. Planting areas and plants shall be protected against trespassing and damage of any kind for the duration of the maintenance period. This shall include the provisions and installation of approved temporary fencing if necessary. If any plants become damaged during the maintenance period, they shall be treated or replaced as directed, at no additional cost to the City of Nashua.

GUARANTEE

a. All plant materials shall be guaranteed for a period of one (1) year after the completion of the specified maintenance period and the date of final acceptance of the entire project, in writing from the Contractor. Plants shall exhibit satisfactory growth and have no less than seventy-five percent (75%) of their branches alive at the end of the guarantee period. If the leader of any single-leader species is dead, the entire plant shall be considered dead.

b. All replacements shall be plants of the same kind and size specified on the "Plant List". They shall be furnished and planted as specified above. The cost shall be borne by the contractor. Replacements resulting from the removal, loss or damage, vandalism or acts of neglect on the part of others, physical damage by animals, vehicles, etc., and losses due to curtailment of water by local authorities, will be approved and paid for by the City of Nashua.

c. At the end of the guarantee period, inspection will be made again. Any plant required under this contract that is dead or unsatisfactory shall be removed from the site. These shall be replaced during the normal planting season, until the plants live through one (1) year.

END OF SECTION

5 YEAR MAINTENANCE PLAN

GENERAL

SCOPE OF WORK

The work to be done under this section shall require the contractor to provide all labor, material, equipment and transportation necessary maintenance per the Maintenance Check List

PERSONNEL QUALIFICATIONS

The planting maintenance shall be done by contractors regularly engaged in landscape construction work, specifically planting installation, and by skilled workers, trained and experienced in accepted horticultural/nursery practices. The work shall be done under the supervision of a qualified planting foreman. Plant installer shall have a minimum of three (3) years of experience in the landscape contracting profession and be able to provide references to the City of Nashua of past related project work.

GENERAL MAINTENANCE REQUIREMENTS

A. The contractor shall provide regular, monthly maintenance services as outlined in these Landscape Maintenance Specifications and the Monthly Checklists for this project site.

B. The contractor shall examine the work area, including irrigation, on a weekly basis, looking for existing or potential problems.

C. The contractor shall provide at his/her own risk all labor, materials, tools, equipment, insurance, transportation, hauling, dumping, and all other items needed to provide the services outlined in this specification.

D. The contractor shall make minor replacements and repairs to the landscape facilities as part of the required weekly maintenance work. Major items needing replacement or repair shall be reported to the owner's representative within one week of occurrence. A minor item would be something that takes less than 15 minutes to repair by skilled workmen, using minimal replacement parts. Some specific guidelines for determining if an item is minor or major are given in the section pertaining to each item. The contractor shall be available to perform additional work related to the landscape maintenance as may be authorized in writing by the owner. Such work shall be non-minor items relating to landscape care, which are not a part of the normal maintenance work as outlined in this specification.

E. Any facilities or property damaged or destroyed as a result of the landscape maintenance contractor's operations at the site shall be repaired or replaced at the landscape maintenance contractor's expense.

CARE OF PLANTED AREAS

1. Allow shrubs three (3) months to rejuvenate following a hard frost prior to pruning or replacing.

2. Any shrub found to be dead or missing shall be replaced with plant material of identical species at the landscape maintenance contractor's expense, unless the loss was due to excluded damage. If the loss resulted from excluded damage, replacement will be paid for as additional work. Submit a quote for replacement within two weeks of the loss as outlined in the General Requirements section of these specifications. Replacement shrubs shall be #5 size as defined by the American Nursery Association.

3. Replacement shrubs shall be at least 18 inches (45 cm) in height when planted, unless otherwise approved by the owner's authorized representative. Place 2 slow-release fertilizer tablets in backfill material, 6 inches (15 cm) deep on opposite sides of the rootball, but not touching the rootball.

4. The cutting blades on pruning shears, clippers, blades, saws, etc. shall be sterilized between every three shrubs to minimize the possibility of spreading disease. When pruning shrubs known or suspected to be diseased, the cutting blades shall be sterilized after each cut. Sterilize blades by dipping them in a solution of 1 part bleach and 9 parts water or heavily spray them with a disinfectant spray, such as Lysol. After dipping or spraying, wait 20 seconds before using again.

WEED CONTROL

1. Weeds in planted areas, sidewalks, curbs, gutters, or pavement shall be removed weekly as the weeds emerge. Weeds shall be removed if they are larger than 2 inches (5 cm) in height or diameter. Dispose of weeds off-site. Use of pre and post-emergent herbicides is prohibited under this contract. No additional payments will be made for herbicide applications. The cost of all weed control work shall be included in the contract price for landscape maintenance. Regular maintenance of the mulch or decorative rock layer will help minimize weeds in shrub and groundcover areas.

2. Soil mulch and/or rock layer shall be cared for as needed to create and maintain an even and uniform appearance over the visible soil surface of each planter area.

3. The contractor shall add additional mulch and/or decorative rock regularly to maintain a layer no less than 2 inches (5 cm) deep at all times in shrub planters. Decomposition of organic mulch is considered normal wear and tear and replacement of decomposed mulch shall be made by the contractor as part of this contract. Mulch and/or decorative rock are not required in areas where plant foliage completely covers the soil surface, such that the soil is not visible through the foliage. Note: only 2 inches (5 cm) of mulch is required, however maintaining a deeper layer of mulch and/or decorative rock greatly reduces the labor and chemicals needed to control weeds, reduces water use, and helps the plants stay healthy.

INVASIVE PLANT CONTROL

1. Manual control techniques include activities such as hand-pulling, digging, flooding, mulching, burning, removal of alternate hosts and manual destruction or removal of nests, egg masses or other life stages. These techniques work best on small populations or in areas where chemicals or motorized equipment cannot be used. Manual control efforts must be persistent and several treatments may be needed to reduce or eliminate the target population.
2. Digging/Hand-pulling
   Remove entire root to prevent resprouting. Usually works best with small or young plants, in sandy or loose soils, or when soils are damp.
3. Smothering
   Use mulch, black plastic, carpet, or any other impenetrable barrier to cover target plants for at least one growing season. The effectiveness of this technique can be increased by first cutting the target plants and then smothering them. If dealing with a species that produces clones, be sure to cover all stems of the species. This is only feasible where water levels can be manipulated to completely cover cut plants for a period of time. The depth of water necessary and the amount of time cut plants should be covered will vary from species to species

Trails Maintenance and Inspection List

1. PARKING LOT AND TRAIL SWEEPING

Trail sweeping is one of the most important aspects of trail maintenance, helping ensure trail user safety. The type of sweeping to be performed depends on trail design and location. Trails that require sweeping of the whole system will be swept by machine. Trails that require only spot sweeping of bad areas will be swept by hand or with blowers. Some trails require a combination of methods. Sweeping will be performed on a regular schedule.

2. TRASH REMOVAL

Trash removal from trail corridors is important from both a safety and an aesthetic viewpoint and includes removing ground debris and emptying trash containers. Trash removal will take place on a regularly scheduled basis, the frequency of which will depend on trail use and location.

3. TREE REMOVAL

The removal of dangerous and fallen trees to allow passage along the trail while retaining features contributing to trail maintenance and to user enjoyment. Timely removal of trail obstructions minimizes visitor-created detour trails which degrade the resource and complicate effective trail maintenance.

4. TREE AND SHRUB PRUNING

Tree and shrub pruning will be performed for the safety of trail users. Pruning will be performed to established specifications on a scheduled and as needed basis, the frequency of which will be fairly low.

5. MOWING OF VEGETATION

Trails maintenance personnel will mow vegetation along trail corridors, fields on a scheduled basis only where mowing.

6. INVASIVE CONTROL

Weed control along trails will be limited to areas in which certain weeds create a hazard to users (such as "Japanese Knot Weed" thorns along trail edges). Environmentally safe invasive removal methods should be used, especially along waterways.

Maintenance to be performed on an as needed basis:

1. TRAIL REPAIR

Repair of asphalt or concrete trails will be closely tied to the inspection schedule. Prioritization of repairs is part of the process. The time between observation and repair of a trail will depend on whether the needed repair is deemed a hazard, to what degree the needed repair will affect the safety of the trail user, and whether the needed repair can be performed by the trails maintenance crew or if it is so extensive that it needs to be repaired by outside entities.

2. GRAFFITI CONTROL

The key to graffiti control is prompt observation and removal. During scheduled trail inspections, graffiti should be noted and the graffiti removed as soon as possible.

3. TRAIL REPLACEMENT

The decision to replace a trail and the type of replacement depends on many factors. These factors include the age of the trail, and the money available for replacement. Replacement involves either completely overlaying and asphalt trail with a new asphalt surface, or replacement of an asphalt trail with a concrete trail. In general, replacing asphalt trails with concrete is desirable. (A discussion of the different philosophies concerning the replacement of an asphalt trail with a concrete surface can be found elsewhere in the Bicycle Master Plan.) Parks Planning will coordinate all trail replacement, and the Trail Coordinator will recommend trails for replacement.

4. TRAIL DRAINAGE CONTROL

In places where low spots on the trail catch water, trail surfaces should be raised or drains built to carry away water. Some trail drainage control can be achieved through the proper edging of trails. If trail drainage is corrected near steep slopes, the possibility of erosion must be considered. Inspect and clean leaching catch basins.

5. TRAIL SIGNAGE

Trail signs fall into two categories: safety and information. Trail users should be informed where they are, where they are going, and how to use trails safely. Signs related to safety are most important and should be considered first. Information signage can enhance the trail user's experience. A citywide system of trail information signage should be a goal.

6. RE-VEGETATION

Areas adjacent to trails that have been disturbed for any reason should be re-vegetated to minimize erosion.

7. RECORDS

Good record-keeping techniques are essential to an organized program. Accurate logs should be kept on items such as daily activities, hazards found and action taken, maintenance needed and performed, etc. Records can also include surveys of the types and frequency of use of certain trail sections. This information can be used to prioritize trail management needs.

8. INSPECTION OF BOLLARDS AND FENCE:

Inspect all the bollards are in good working order and fences are not in disrepair.

9. INSPECTION OF BRIDGES AND BOARDWALK

Inspect all railing, decking, kicks, and foundations.

END OF SECTION

BIDDERS QUALIFICATIONS

IFB0592-010615

General Contractor

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The bidder may submit any additional information they so desire.

1. Name of Bidder:

2. Permanent Main Office Address:

3. When Organized:

4. If a corporation, where incorporated:

5. How many years have you been engaged in general contracting under your present firm or trade name?

6. General description of work performed by your firm:

7. List all current contracts and projects:

Project & Location	Description	Contract Value	Percent Complete	Contact-Phone

8. List three comparable projects completed by your firm.

Project & Location	Description	Contract Value	Date Complete	Contact	Phone

The above information will be used to check references.

The bidder hereby certifies that the firm and all principals are not debarred which would make it ineligible for this Contract.

Dated at _____ this _____ Day of _____,201

_____
Name of Bidder
By:_____

State of _____)

County of _____)

_____, being duly sworn, deposes and says that he

is the _____ of

_____ and that the answers to the foregoing

questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 201

_____
Notary Public

BASE BID ITEMS—PAGE 1 OF 2 **IFB0592-010615**

Itemized as follows:		Labor	Materials
1)	Site Clearing/Trail	$_____	$_____
2)	Survey work along Groton Rd. to confirm Right of way and easements Install metal rods	$_____	$_____
3)	(1) Parking Lot	$_____	$_____
4)	Timber Steps	$_____	$_____
5)	Striping	$_____	$_____
6)	3" X 8' Asphalt Trail	$_____	$_____
7)	Tip Down	$_____	$_____
8)	3" X 5' Asphalt (sheet 12)	$_____	$_____
9)	Natural Trail	$_____	$_____
10)	Crosswalk Striping	$_____	$_____
11)	Rain Gardens	$_____	$_____
12)	Erosion Control	$_____	$_____
13)	(1) Timber Boardwalk	$_____	$_____
14)	Log Step Installation	$_____	$_____
15)	Slope Stabilization W/ Logs	$_____	$_____
16)	Groton Rd Drain Work	$_____	$_____
17)	Educational Signs	$_____	City Supplies
18)	4"X4" Trail Markers	$_____	City Supplies
19)	Trail Signs	$_____	City Supplies

Company Name: _____

		Labor	Materials
20)	Educational Signage	$_____	City Supplied
21)	Solar Lights (parking lots)	$_____	City Supplied
22)	Kiosk Solar Lighting	$_____	City Supplied
23)	Bridge	$_____	City Supplied
24)	(6) Concrete abutments	$_____	City Supplied
25)	(1) Boardwalk (metal)	$_____	City Supplied
26)	Collapsible bollards	$_____	City Supplied
27)	4) Timber Kiosks	$_____	City Supplied
28)	Roadway Warning signs	$_____	City Supplied
29)	Wooden Post with 3/8" Chain	**BY OTHERS**	
31)	2 Rail Rustic timber Fence	**BY OTHERS**	
32)	3 Rail timber Fence	**BY OTHERS**	
33)	6 X 6" Timber Bollard	**BY OTHERS**	

34) 5 Year Maintenance Program

Year 1 Maintenance Plan	$_____
Year 2 Maintenance Plan	$_____
Year 3 Maintenance Plan	$_____
Year 4 Maintenance Plan	$_____
Year 5 Maintenance Plan	$_____

TOTAL BASE BID ITEMS 1-34 **$_____** **LABOR*** ** **$_____** **MATERIALS*****

Note: Show bid amount in both words and figures. In the case of discrepancy, the lesser amount shown shall govern. Bidder agrees to perform all the construction work described in the project documents, detailed in the specifications and plans, for the contract sum of:

TOTAL BASE BID—LABOR AND MATERIALS* ABOVE**

Written:_____ **$**_____

Company Name: _____

ALTERNATE BID ITEMS **IFB0592-010615**

See Plans 9, 27, 28 for details

Itemized as follows:		**Labor**	**Materials**
1)	Site Clearing/Trail	$_____	$_____
2)	Natural Trail	$_____	$_____
3)	Trail Signs	$_____	City Supplied
4)	1) Timber Kiosk	$_____	City Supplied

5) Maplewood Conservation Trail Maintenance (Details provided at the Mandatory Pre-bid Meeting) $_____

6) **5 Year Maintenance Program (all locations)**

Year 1 Maintenance Plan	$_____
Year 2 Maintenance Plan	$_____
Year 3 Maintenance Plan	$_____
Year 4 Maintenance Plan	$_____
Year 5 Maintenance Plan	$_____

7) Maintaining Hay fields on Buckmeadow Rd $_____

TOTAL BID ALTERNATE ITEMS 1-7 $_____ **LABOR*** ** $_____ **MATERIALS*****

BASE BID (FROM PAGE #65) $_____ **LABOR*** ** $_____ **MATERIALS*****

GRAND TOTAL BASE & ALTERNATES$_____ **LABOR*** ** $_____ **MATERIALS*****

Company Name: _____

SUBCONTRACTORS

If the undersigned proposes to award subcontractors for the portions of the work, then the name of the subcontracting firm shall be listed below. No substitutions, or additional subcontracts may be made after this bid is filed without the written approval of the City of Nashua's Planning Department representative.

Subcontractors Proposed:

Company	Percentage of MBE/WBE Description of Work	Contract Value	Section 3

TIME OF COMMENCEMENT & TIME OF COMPLETION

It is the intent of the City of Nashua to award a contract as soon after receipt of bids as possible. The Undersigned agrees that the Work shall be completed by July 31, 2015 in total detail as noted above.

GENERAL

The undersigned has checked all the figures contained in this bid, and further understands that the Owner will not be responsible for any errors or omissions made herein by the undersigned.

It is understood that the right is reserved by the City of Nashua to reject the bid, to waive all informalities in connection herewith, and to award a contract for any part of the work or project as a whole. It is agreed that this bid may not be withdrawn for a period of thirty days after it has been opened, without permission of the City of Nashua.

The undersigned declares that the people or a person signing this bid is/are fully authorized to sign on behalf of the named firm and to fully bind the named firm to all the conditions and provisions thereof.

It is agreed that the undersigned has complied and/or will comply with all requirements concerning licensing and with all local, state and national laws, and that no legal requirements have been or will be violated in making or accepting this bid, in awarding the contract to him/her, and/or in the prosecution of the work required thereunder.

Respectfully submitted, this _____ day of _____, 201

Company Name: _____

Address: _____

_____

_____

Email: _____

Phone: _____

By: _____

Title: _____

Date: _____